Vol. 1 FEBRUARY, 1920 No. 2

JOURNAL OF MAMMALOGY

Published Quarterly by the American Society of Mammalogists

CONTENTS

		PAGE
Migrations of the Graysquirrel	*Ernest Thompson Seton*	53
An Apparent Effect of Winter Inactivity upon Distribution of Mammals	*Hartley H. T. Jackson*	58
The Florida Water-Rat in Okefinokee Swamp	*Francis Harper*	65
For a Methodic Study of Life-Histories	*Ernest Thompson Seton*	67
Identity of the Bean Mouse of Lewis and Clark	*Vernon Bailey*	70
A New Fossil Rodent from the Oligocene of South Dakota	*Gerrit S. Miller, Jr., and James W. Gidley*	73
The Status of Pennant's Mexican Deer	*Wilfred H. Osgood*	75
A New Race of the Florida Water-Rat	*Arthur H. Howell*	79
New Rodents and New Bats from Neotropical Regions	*H. E. Anthony*	81
General Notes		87

Red Bat and Spotted Porpoise off the Carolinas, *J. T. Nichols;* The Coyote not Afraid of Water, *H. C. Bryant;* The Florida Spotted Skunk as an Acrobat, *A. H. Howell;* The Felis ocelot of Hamilton Smith, *W. H. Osgood;* On Gueldenstaedt's Names of Certain Species of Felidæ, *J. A. Allen;* The Wood Rat as a Collector, *W. P. Taylor;* Novel Nesting Place of the Red-backed Mouse, *W. P. Taylor;* Range of the Hoary Marmot in Montana, *A. A. Saunders;* Rodent Mountaineers, *W. P. Taylor;* Does the Cuterebra ever Emasculate its Host, *E. T. Seton;* Flying Squirrel as a Bird Killer, *H. L. Stoddard;* Technical Names of two Colobus Monkeys, *J. A. Allen.*

Recent Literature		97
Correspondence		104
Editorial Comment		108

PUBLISHED AT
MOUNT ROYAL AND GUILFORD AVENUES
BALTIMORE, MARYLAND

WILLIAMS & WILKINS COMPANY
BALTIMORE, U. S. A.

Entered as second-class matter, November 22, 1919, at the Postoffice, Baltimore, Md., under the Act of March 3, 1879.

The American Society of Mammalogists

Founded April 3, 1919

C. HART MERRIAM, *President*
E. W. NELSON; WILFRED H. OSGOOD, *Vice-Presidents*
H. H. LANE, *Recording Secretary*
HARTLEY H. T. JACKSON, *Corresponding Secretary*
WALTER P. TAYLOR, *Treasurer*
N. HOLLISTER, *Editor*

Additional Members of the Council

1919–1920	1919–1921
T. S. PALMER	GERRIT S. MILLER, JR.
RUDOLPH M. ANDERSON	GLOVER M. ALLEN
M. W. LYON, JR.	WITMER STONE
W. D. MATTHEW	JOSEPH GRINNELL
EDWARD A. PREBLE	JOHN C. MERRIAM

Standing Committees

Publications: N. Hollister, *Chairman.* Gerrit S. Miller, Jr., Edward A. Preble, Hartley H. T. Jackson, Walter P. Taylor.

Life Histories of Mammals: Chas. C. Adams, *Chairman.* Rudolph M. Anderson, Vernon Bailey, Harold C. Bryant, Lee R. Dice, Hartley H. T. Jackson, T. S. Palmer, Ernest Thompson Seton, Walter P. Taylor, Herbert Lang.

Study of Game Mammals: Charles Sheldon, *Chairman.* George Bird Grinnell. Other members to be added by chairman.

Anatomy and Phylogeny: W. K. Gregory, *Chairman.* John C. Merriam, H. H. Donaldson, Alexander Wetmore, Hermann von W. Schulte, J. W. Gidley.

Bibliography: T. S. Palmer, *Chairman.* Wilfred H. Osgood, Hartley H. T. Jackson.

The Journal of Mammalogy

Subscription rates, $3.50 per year; single numbers $1.00 each. Sent free to all members of the American Society of Mammalogists not in arrears for dues.

Manuscripts for publication, books and papers for notice and review, etc., should be sent to the Editor, Mr. N. Hollister, National Zoological Park, Washington, D. C.

Subscriptions, changes of addresses, requests for missing numbers, applications for advertising rates, etc., should be sent to the Corresponding Secretary, Dr. Hartley H. T. Jackson, Biological Survey, Washington, D. C.

JOURNAL OF MAMMALOGY

Published Quarterly by the American Society of Mammalogists

VOL. 1 FEBRUARY, 1920 No. 2

MIGRATIONS OF THE GRAYSQUIRREL (SCIURUS CAROLINENSIS)

BY ERNEST THOMPSON SETON

One of the most interesting animal phenomena recorded by the early naturalists was the migration, or rather the emigration, of the gray-squirrel.

A true migratory animal is one that makes a periodic change of range, which has a definite going, and a definite return. Thus the migration of birds, bats, and caribou are definite seasonal changes followed always by a return movement, but the migration of the gray-squirrel will I think be found in a different class.

In all the early natural histories this squirrel is called "migratory," and amazing accounts are given of its armies appearing to devastate the farms of whole regions. I have found no living man recently, who has seen one of these and can describe it, so must rest content with a compilation from two rambling accounts by the naturalists Kennicott, U. S. Pat. Off. Rept. for 1856 (1857) and Bachman (Quad. N. Amer., 1846). The paragraphs from each are followed by the initials "K." or "B."

> The most interesting feature in the habits of this animal is the remarkable migration performed at times by large bodies of them. . . . . Immense numbers congregate in autumn, and move off together, continuing their progress in the same general direction, whatever it may be [nearly all recorded moved easterly, one only south, and one north], not even turning aside for large streams. . . . . They moved along rather leisurely, stopping to feed in the fields, and upon the abundant nuts and acorns of the forests. So far had they departed from their accustomed habits that they were seen on the prairie, four or five miles from any timber; but even there, as usual, they disliked to travel on the ground, and ran along the fences wherever it was possible. (K.)

The farmers in the Western wilds regard them with sensations which may be compared to the anxious apprehensions of the Eastern nations at the flight of the devouring locust. At such periods, which usually occur in autumn, the squirrels congregate in different districts of the far Northwest; and in irregular troops bend their way instinctively in an eastern direction. Mountains, cleared fields, the narrow bays of our lakes, or our broad rivers, present no unconquerable impediments. Onward they come, devouring on their way everything that is suited to their taste, laying waste the corn and wheat-fields of the farmer; and as their numbers are thinned by the gun, the dog, and the club, others fall in and fill up the ranks, till they occasion infinite mischief, and call forth more than empty threats of vengeance. (B.)

Ordinarily averse to entering the water, they now take to it boldly, and though swimming with difficulty, manage to cross broad rivers, like the Niagara and the Ohio, though many are drowned in the attempt. . . . .

Sometimes, when on these migrations, especially after crossing rivers, the squirrels become so fatigued as to be easily captured, and thousands are then killed by boys armed merely with sticks and stones. I learn from Dr. John A. Kennicott that, during one of these migrations, innumerable squirrels swam across the river Niagara, and landed near Buffalo, New York, in such a state of exhaustion that the boys caught them in their hands, or knocked them from the fences and bushes with poles. (K.)

They swam the Hudson in various places between Waterford and Saratoga; those which we observed crossing the river were swimming deep and awkwardly, their bodies and tails wholly submerged; several that had been drowned were carried downwards by the stream, and those which were so fortunate as to reach the opposite bank were so wet and fatigued, that the boys stationed there with clubs found no difficulty in securing them alive or in killing them. Their migrations on that occasion did not, as far as we could learn, extend farther eastward than the mountains of Vermont; many remained in the county of Rensselaer, and it was remarked that for several years afterwards squirrels were far more numerous there than before. It is doubtful whether any ever return to the west, as, finding forests and food suited to their taste and habits, they take up their permanent residence in their newly explored country, where they remain and propagate their species, until they are gradually thinned off by the increase of inhabitants, new clearings, and the dexterity of the sportsmen around them. (B.)

AFTER THE TREK

After one of these grand migrations, very few of the species are found in the localities from which they have moved, and these, as if alarmed at the unusual solitude, are silent and shy. They rapidly increase in numbers, however, and, in a few years, are as abundant as before. I am not aware that they ever migrate except when exceedingly abundant. Of these immense hordes, but few probably survive. No sudden increase in their numbers was heard of in Southern Wisconsin after the several migrations from Northern Illinois. Many are drowned in attempting to cross streams as has been stated; not a few are destroyed by man; some die from utter exhaustion; and, when thus forced to travel, in an unnatural manner, upon the ground, they fall an easy prey to rapacious birds and mammals, all of which feast when the squirrels migrate. (K.)

These migrations are now a thing of the past, so that we can but piece together the accounts of the earlier naturalists, in seeking to explain such movements of the squirrel population. There are not many of these records, and those that exist are commonly deficient in not stating the direction or extent of the migration. The earliest I find is in Kalm's "Travels," p. 316. He speaks of a squirrel migration from the mountains to the lowlands of eastern Pennsylvania in 1747.

The best observations are by Dr. P. R. Hoy of Racine, Wisconsin. He witnessed a great migration of squirrels from Wisconsin, southwest, for four weeks in the early autumn of 1842, and again in 1847, 1852, and 1857.

Dr. S. P. Hildreth (Pioneer History of the Ohio Valley), 1848, quotes from the manuscript of Col. James Baker, of the graysquirrel "coming in millions from the north to the south, destroying whole fields of corn in a few days." (Mam. Ohio, H. W. Brayton, 1882.)

Doctor Bachman states that in the autumn of 1808 or 1809 great hordes came from the west into northern New York and Vermont; and of yet another migration in 1819 on the Ohio, 100 miles below Cincinnati, when for about 130 miles he saw "large numbers of Squirrels swimming across the river" "strewed as it were on the surface of the water." This is the only available note that indicates the width of the migrating army.

Robert Kennicott records a migration from Canada across the Niagara River into western New York. According to the Bay City Tribune (Michigan) February 17, 1907, there was a great squirrel migration there in 1866.

A careful review of the evidence makes it very clear that these movements of the squirrels were not in any true sense migrations. That is, they were not seasonal or annual or periodic or balanced by a return movement of any kind. They were simply wholesale movements of a huge population from one region to another. Judging from numerous parallel cases, such a movement could arise only from one of five causes: Flood, fire, famine, pests or over-population. There is no evidence for the first or second; as to famine, Kennicott, who has the most complete and detailed observations of all, makes a point of it that they are not driven forth by want of food, for the animals are fat at the time and the regions they leave still abound with food. Furthermore, the season when they go forth is early autumn, the time of the greatest food abundance. The migration that Merriam reports in the Adirondacks and that Jackson describes in Wisconsin are very small affairs and in all respects of a different class.

It is possible that the vast multiplication of nesting places may have resulted in an insupportable increase of parasites in the shelters so that the nests had become untenable. But of this there are only two shreds of evidence at hand. One, the known fact, that overcrowded squirrel nests breed abundant parasites; second the squirrels are comparatively scarce after the army has gone. Thus the evidence is far from conclusive.

We have, then, the last cause to consider—over-population. The army has always come from a land of plenty—a place of ideal squirrel conditions—at a time when they seemed at their best, and further, the time of migration is always just as the broods of the year are full grown. No one has ever recorded a squirrel migrating from a land when they were few or moderate in numbers, always from a place where they overabounded. No one has witnessed one of these treks since the squirrels became comparatively scarce.

This explanation is paralleled by the known causes that send the Scandinavian lemming and the African springbok millions, out of their country and on, till they meet their end; and last, probably most exactly, *by the swarming of bees;* the sallying forth of the new brood to seek a new home, for there is not room in their birthplace. In a word then, the graysquirrel swarms as the bees swarm; this explains their marching armies. But the dwindling of their numbers has put an end to their emigrations. I have not yet heard of one since 1866.

NUMBERS

How are we to form any idea of their numbers in primitive times when the whole land was one big harvest field of nuts for their chief benefit?

The early naturalists seemed satisfied to describe the squirrel hordes as "astounding," "immense," "myriads," "incredible," or "unbelievable," and we rejoice that Kennicott and others of more exact mind were born in time to make a more satisfactory record. Kalm relates (Travels, p. 320) that in the year 1747 the State of Pennsylvania paid bounties for the killing of 640,000 squirrels. In "The Hunter's Feast," published about 1840 (p. 163) is an account of an all-week Kentucky squirrel hunt in which the sides with 6 guns on each, killed respectively 5000 and 4780 squirrels.

Robert Monro writes in 1804 of squirrel hunts in western New York in which upwards of 2000 squirrels have sometimes been killed in one day. (Merriam, Mam. Adirondacks, p. 229.)

Dr. P. R. Hoy knew of "an Ohio hunter that killed 160 in one day in an 'off season.' In parts of Michigan, Illinois, Southern Wisconsin and Indiana, they are no less numerous." (Quad. Ill., 1857, p. 63.) Doctor Bachman saw 130 miles of the Ohio "strewed" with them in 1819; an old settler of Bay City, Michigan, records (Bay City Tribune, 17 Feb., 1907) that in the migration of 1866, one of the last, he counted 1400 squirrels while driving 2 miles.

Finally if we recall, as the third dimension, that Doctor Hoy found it took a month for the army to pass, we have some basis for calculation. Allowing that the squirrels travelled 5 miles a day, we have an army, 130 miles wide, 150 miles long, in which as many as 1400 might be seen by the road within 2 miles. That road must have been through the woods, therefore 20 yards on each side would be the limit of view. This would mean 30,000 to the square mile, or 450,000,000 squirrels in the dimensions recorded. Such numbers seem incredible, and yet that is what the old naturalists said they were, *unbelievable*, *incredible*, etc.

Even if we largely discount these figures, we must remember that there are many such armies and that only a small section of the range was represented; not more than one-fortieth of it.

A corroboration of these high rates is found in a recent occurrence. The graysquirrels in Central Park, New York, became over-many. It was decided to thin them out; 300 were shot in one week without making much perceptible difference. There were at least twice as many left in the woods which cover nearly half of this 800-acre park. That is, there were over 1000 to the 300 acres of timber.

In my recollection of a squirrel woods in Ontario, 1887, the numbers in Central Park are not to be compared to those in the northern woods. They were at least three times as numerous in the latter and yet we knew that there were about 3 to the acre in the park.

In western Texas there is, according to the Biological Survey, a prairiedog town of 25,000 square miles, with an estimated population of 400,000,000 or 25 to the acre. This is probably a higher rate than the graysquirrel ever attained to, but it shows the possibilities even with an animal of more than double the size.

The range of the graysquirrel is about 1,000,000 square miles; allowing, that in half of this, they were scarce, and that in the teeming parts they were no more numerous than in Central Park, we have an estimate of 1,000,000,000 as the lowest guess at the primitive number that one can arrive at. But we have noted above one of several armies that totalled nearly half a billion. Who then can doubt, in view of this,

that the graysquirrel population in the palmy days of 1800 may easily have numbered several billions.

These great movements have never been clearly observed. The only way at present possible to fill the gap is by collecting the testimony of eyewitnesses—the old-timers who are passing away—for I have little faith in any great emigration since 1870. That was about the latest date at which primitive conditions continued anywhere in the northern Mississippi Valley.

Will not our young naturalists render service now by interviewing all available old-timers—the men who joined in the squirrel hunts of the '60's—and make as full a record as possible of the time, place, extent, direction, etc., of every emigration that can be traced, together with facts that bear upon its cause and results or that in any way offer interesting light?

AN APPARENT EFFECT OF WINTER INACTIVITY UPON DISTRIBUTION OF MAMMALS

By Hartley H. T. Jackson

INTRODUCTION

It was the writer's pleasure during the past summer (1919) to spend a few weeks investigating the terrestrial vertebrate fauna of the Apostle Islands, Wisconsin, as a part of the general study of the land vertebrates of the state now being undertaken by the United States Biological Survey, the Wisconsin Geological and Natural History Survey coöperating. My first visit to the islands was from June 22 to 26, when all the time was spent on Madeline Island. I again visited the islands July 3 to 24, accompanied by Mr. Harry H. Sheldon and Mr. Arthur J. Poole who assisted in the work. On this second visit careful investigations were made on Madeline Island, July 3 and 4, 12 to 15, 20 and 21; Outer Island, July 5 to 11; Presque Isle or Stockton Island, July 15 and 16; Gull Island, July 18; Little Manitou Island or Gull Rock, July 18; Michigan Island, July 18; and Sand Island, July 23. Observations of a more or less superficial nature were also made on other islands, but physiographical conditions were such that the more intensive work on the islands selected undoubtedly gave us a fairly accurate idea of the mammalian fauna of the islands as a whole. Mr. Sheldon and Mr. Poole returned to the islands September 4 and remained until

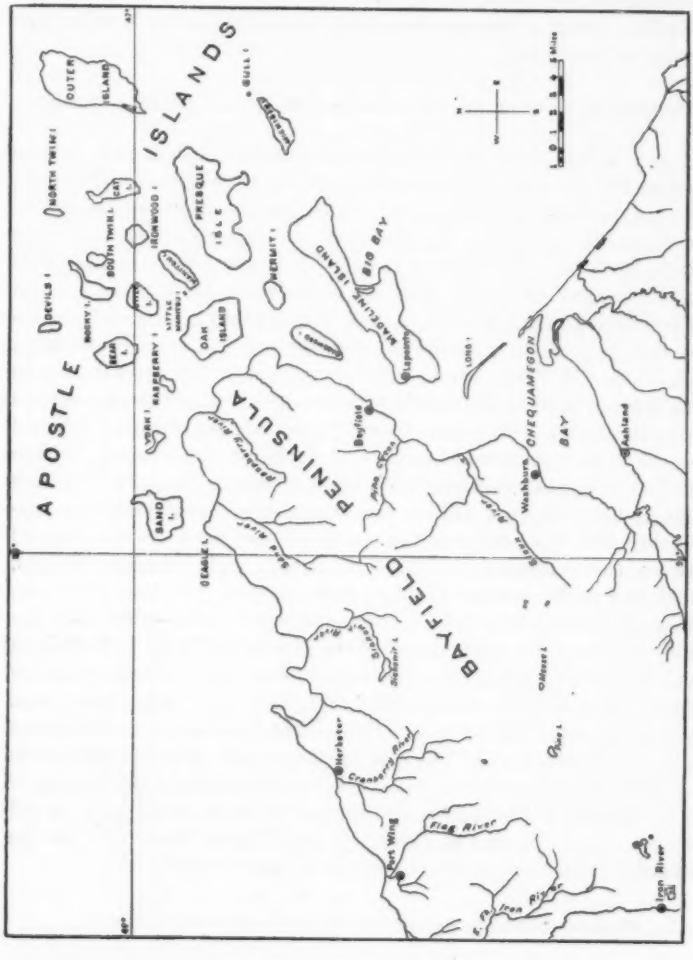


FIG. 1. MAP OF APOSTLE ISLANDS AND ADJACENT MAINLAND

September 19, spending the greater part of their time on Outer and Madeline Islands. On this last visit, however, little attention was devoted to mammals.

HISTORICAL SKETCH OF THE GEOLOGY OF THE APOSTLE ISLANDS

If one should look at a detailed map of the western end of Lake Superior there will be seen extending northeasterly from the Wisconsin shore a prominent peninsula, the terminal portion of which appears to have been submerged and separated into a number of islands. This is exactly what has taken place. In earlier geological times these islands were connected en masse with the mainland. During the Glacial Period a tilting began which has even increased since then and is probably still in progress (Martin, Wisconsin Geol. and Nat. Hist. Surv., Bull. 36, p. 424, May, 1916). The separation of the Apostle Islands from the mainland is due largely to submergence of old stream valleys during this tilting. The exact time of permanent separation is believed by some to have occurred since the last glaciation of the region, but the fact that the greatest amount of tilt in evidence since the Nipissing Stage of Lake Superior (which was late in the Glacial Period) is considerably less than one-half the depth of the water in the channel between the mainland and Oak, Basswood, and Madeline Islands, would tend to throw some doubt on such a theory. Be that as it may, during the Glacial Period the terrestrial fauna of the islands was completely destroyed by submergence of the islands in Glacial Lake Duluth which maintained a level about 500 feet above that of Lake Superior today. Lake Duluth slowly changed to the Lake Algonquin stage which stood some 350 feet above the present lake and was of sufficient depth to submerge all of the islands except Oak Island (altitude 480 feet above Lake Superior). So complete was this glacial destruction of the topography of the islands that there is no trace whatever of an old drainage system on any of them. It would seem therefore that the terrestrial fauna must be of comparatively recent ingression.

PHYSIOGRAPHICAL FEATURES OF THE APOSTLE ISLANDS

Turning now to the present, we find the islands 23 in number and varying in size from Madeline Island which is over 12 miles long and nearly 3 wide, to Little Manitou Island (or Gull Rock) which is only 300 feet long and 30 feet broad basally, narrowing to about 5 feet in

width at the summit. Little Manitou Island will soon meet the fate of Steamboat Island which has entirely disappeared by action of wind and waves within the memory of man.

There is for the most part a general similarity in the topography of the islands. The east and northeast sides generally rise from the water's edge in precipitous red sandstone cliffs varying from 10 to 80 feet high, usually 10 to 30 feet. Sandy beaches are most likely to be on the southwestern shores. Northern, western, and southern slopes are frequently steep clay-banks. A few more or less intermittent small creeks offer some surface drainage, but most of the precipitation washes directly down the banks into the lake. There are a few sloughs surrounded by marshes and bogs on some of the islands, the largest being near Big Bay on the southeastern side of Madeline Island midway its length. Other sloughs of considerable size are near the southwestern corner of Outer Island, and near the base of Presque Isle Point towards the eastern end of Presque Isle. Each of these sloughs has been formed by a separation of a body of the lake by sand beaches. The inland sides of the sloughs tend to be more boggy than the outer sides. These bogs contain a vegetation typical of sphagnum-cassandra bogs, the tamarack and spruce growth being limited. They differ in no essential features from the same type of bog on the mainland.

The islands are covered with a Canadian Zone vegetation which on Outer, Michigan, Cat, and a few other islands has been undisturbed by civilization but on others has been more or less destroyed by lumbermen. Spruces (*Picea canadensis* and *mariana*), balsam fir (*Abies balsamea*), pines (*Pinus strobus, resinosa* and *divaricata*), arbor vitæ (*Thuja occidentalis*), hemlock (*Tsuga canadensis*), ground hemlock (*Taxus minor*), mountain maple (*Acer spicatum*), mountain ash (*Sorbus americana*), birches (*Betula papyrifera, lenta* and *lutea*), and aspens (*Populus tremuloides*) constitute a greater portion of the vegetation, while around the bogs and sloughs is found a growth of alders and willows. In all ecological features the islands offer an environment for mammals similar to that of the mainland and on casual observation one would think conditions ideal for an abundance of mammalian life. As a matter of fact mammals are poorly represented in number of individuals and, even more so, in number of species.

MAMMALIAN FAUNA OF THE APOSTLE ISLANDS COMPARED WITH THAT OF THE MAINLAND

A comparison of the mammalian fauna of the Apostle Islands with that of the Wisconsin shore of Lake Superior reveals some interesting factors in distribution. A careful study of the mammals of the islands with intensive collecting for the smaller ones resulted in our obtaining records of only 18 species. Specimens were secured of the red squirrel (*Sciurus hudsonicus*), Canadian white-footed mouse (*Peromyscus maniculatus gracilis*), red-backed mouse (*Evotomys gapperi gapperi*), meadow mouse (*Microtus pennsylvanicus pennsylvanicus*), coyote (*Canis latrans latrans*), masked shrew (*Sorex personatus personatus*), and short-tailed shrew (*Blarina brevicauda*). Three others, Minnesota varying hare (*Lepus americanus phæonotus*), hoary bat (*Nycteris cinereus*), and a small bat (*Myotis* sp.) were seen by members of our party, the hare several times. Tracks were seen of the muskrat (*Fiber zibethicus zibethicus*) and the red fox (*Vulpes fulvus fulvus*). Reliable reports from residents of the islands show the presence of northern white-tailed deer (*Odocoileus virginianus borealis*), wharf rat (*Rattus norvegicus*), house mouse (*Mus musculus musculus*), otter (*Lutra canadensis*), a weasel (from descriptions probably *Mustela cicognanii*), and the Minnesota mink (*Mustela vison letifera*).

One who is familiar with the habits of mammals will notice that with the exception of the bats these are all mammals that are more or less active in winter. Bats probably ingressed the islands by flight in the summer season. The wharf rat and the house mouse were probably introduced in freight shipments. Others, such as the red squirrel, muskrat, otter, mink, and possibly the deer, may at times have swum from the mainland to the islands. However, except the aquatic mammals, the bats, the wharf rat and house mouse, the mammals known to inhabit the islands resolve themselves into two categories: namely, (A) those that are active in winter and wander considerable distances at such times, and (B) those that are more or less active in winter and are frequently found among driftwood and logs near the beach.

The mammals that travel considerable distances during the winter include the deer, red squirrel, varying hare, red fox, coyote, and weasel. Inquiry of residents of the islands and Bayfield disclosed the fact that each of these animals has at times been seen on the ice. Definite statements of deer, varying hares, a red fox (silver phase), and coyotes

having been shot on the ice were given. The minimum distance between the mainland and the nearer islands is approximately 1½ miles, which would by no means be excessive even for some of the smaller mammals.

Into the second category (B), those mammals which are active in winter and frequently found among logs and driftwood near the beach, fall the Canadian white-footed mouse, red-backed mouse, meadow mouse, masked shrew, and short-tailed shrew. These mammals were probably carried to the islands on driftwood, particularly with the ice floes and jams in the spring. The power of these floes to carry debris and vegetation can be appreciated only by one who has seen the results of the impacts of this ice along the shores of the islands.

Turning now to the mammals of the mainland as represented by observations made at Bayfield, and collections and observations made at Herbster and Orienta, Wisconsin, we find present all of the species of mammals found on the islands and in addition the following relatively common: gray chipmunk (*Tamias striatus griseus*), little striped chipmunk (*Eutamias borealis neglectus*), striped ground-squirrel (*Citellus tridecemlineatus tridecemlineatus*), Canada woodchuck (*Marmota monax canadensis*), jumping mouse (*Zapus hudsonius hudsonius*), porcupine (*Erethizon dorsatum*), Mearns cottontail rabbit (*Sylvilagus floridanus mearnsi*), Minnesota skunk (*Mephitis mephitis minnesotæ*), and the black bear (*Ursus americanus americanus*). A glance at this list and we note that with the exception of the cottontail all of these mammals are inactive in winter. The cottontail has only recently ingressed the region, having made its first appearance near Bayfield within the last ten years. The same applies to the striped ground-squirrel. Of the other mammals not found on the islands the gray chipmunk, little striped chipmunk, Canada woodchuck, jumping mouse, and black bear are known to hibernate; the skunk, while not in a true state of hibernation, remains in a state of lethargy during the winter in a den in the ground; and the porcupine at this season is inactive, spending weeks at a time in the top of a single tree or in a hollow log in the forest. The hibernating mammals spend their dormant periods in nests in the ground and are well protected from the effects of ice erosion which takes place in the early spring. The point of course can be raised that only negative evidence is supplied as proof of the absence of these mammals on the islands. But this negative evidence is so strong that it is fairly conclusive. Special effort with approved means of collecting was made to obtain each of these species on the islands. Methods of calling chipmunks, ground squirrels, and woodchucks which never

failed on the mainland were futile here. Moreover old-time residents of the islands, men who were familiar with outdoor life, repeatedly told me that chipmunks, "gophers" (ground squirrels), woodchucks, porcupines, skunks, and bears were not found on the islands. One of the islands is called "Bear Island" but I could find no evidence that a bear had ever been seen on that or any other island of the group. It is said that a few cottontail rabbits have been seen at Lapointe, but I was unable to secure verification of their presence there. In view of the habits of this mammal its occurrence on the islands may be expected.

CONCLUSION

It can be seen from these remarks that the mammals known to inhabit the Apostle Islands are all more or less active during the winter, while those inhabiting the adjacent mainland and not known from the islands tend to be inactive in winter. Bearing in mind that the terrestrial biota of these islands is, geologically speaking, very recent and has been derived from the mainland, it is strongly suggested that this winter inactivity has had an influence on the distribution of certain mammals by tending to prevent them from crossing on the ice and keeping them out of the debris carried from the beaches by the ice floes. While present evidence indicates complete isolation of mammals inactive in winter from the islands, it would seem that this restriction would retard ingression of these mammals onto the islands rather than completely inhibit it.

THE FLORIDA WATER-RAT (NEOFIBER ALLENI) IN OKEFINOKEE SWAMP, GEORGIA

By Francis Harper

[*Plate 3*]

At the present time, while energetic efforts are being made by the Okefinokee Society to save this paradise of woods and waters from complete destruction by lumbering and other commercial operations, it seems worth while to call attention to one of its most recently discovered features of zoological interest.

In 1912, during the course of reconnaissance work by Dr. A. H. Wright and others of the Cornell expedition,[1] as well as by the writer, some curious grass nests, of mammalian manufacture, were noticed on Floyd's Island Prairie. Nothing more than conjectures could be made at that time regarding the identity of the nest-makers, since no specimens were obtained, and since there were no published records of *Neofiber* from farther north than Gainesville, Florida. The mystery was solved in early January, 1917, when, with the help of Jackson Lee, a resident of the swamp, I trapped here several specimens of *Neofiber alleni*.

The surface of Floyd's Island Prairie is largely occupied by sphagnum. Among the other plants growing here are "little-bladed saw-grass"[2] (*Scleria trichopoda?*), maiden-cane (*Panicum hemitomon*), "cat-tail" (*Erianthus saccharoides*), fern (*Anchistea virginica*), pitcher plant (*Sarracenia minor*), "hardhead" (*Xyris fimbriata*), a sedge (*Dulichium arundinaceum*), marsh St. John's-wort (*Triadenum virginicum*), and a bog herb (*Syngonanthus flavidulus*). In the more open parts of the prairie, such as the "runs" and the "'gator-holes," "bonnets" (*Nymphaea macrophylla*) and "never-wets" (*Orontium aquaticum*) are common. "Little-bladed saw-grass" seems to enter chiefly into the construction of the upper part of the nest, and maiden-cane also is used. One fresh nest was made largely of fibrous roots, with a covering of maiden-cane. The foundation of another consisted of roots and coarse, matted vegetation. One of the homes was situated in a clump or tuft of "cat-tail" (*Erianthus*), and another among broom-sedge and maiden-cane. The foundations rested on top of the sphagnum rather than in the water. The water-level on the prairie at this time, however, was

[1] *Cf.* Wright and Harper, A Biological Reconnaissance of Okefinokee Swamp: The Birds. The Auk, XXX, October, 1913, pp. 477-505.

[2] Names in quotes are those in local use in the swamp.

somewhat lower than usual. The nests, though not exactly measured, were probably about 12 to 18 inches in diameter, and 10 to 15 inches high.

There is comparatively little open water on the prairie, and *Neofiber* here seems to be a bog inhabitant rather than an aquatic animal. Its runways lead away from the nests over the sphagnum and peat, among the stems of fern and maiden-cane. Water stands in the runways in places, but for the most part is hardly deep enough to cause the animals to swim. Here and there the runways become tunnels through the sphagnum; and one may also see where the animals have made diggings down into the bog, evidently in search of roots. Lee discovered some fern (*Anchistea*) roots that had been chewed, and we sampled them ourselves. They tasted tolerably good, suggesting a raw peanut, and were quite slippery to the tongue.

The nest chamber is in effect an anticlinal tunnel connecting with runways on opposite sides of the nest. The entrances are about at the water-level. The floor of the tunnel at its middle part, while elevated above the water-level, is not necessarily dry. In some, but by no means all, of the nests, the middle part of the tunnel was occupied by a little bed of soft and fairly dry vegetation, distinct from the mass of the nest. Perhaps these are places for the reception of the young. On January 5 my companion found in a nest two small and scantily haired young ones, with eyes not yet open. In one case the upper part of a *Neofiber* house was found to contain a little nest of finer material, evidently belonging to a rice rat (*Oryzomys palustris palustris*) which was trapped there.

We found other nests on Cowhouse Prairie and on Chase Prairie. Notwithstanding the evident abundance of the animals, we caught no glimpse of them at their nests or elsewhere. Apparently they are very shy. In the Okefinokee vernacular they are known as "prairie rats" or "water rats."

FIG. 1. FLOYD'S ISLAND PRAIRIE, OKEFINOKEE SWAMP; THE HAUNT OF NEOFIBER ALLENI
May 22, 1912. Francis Harper

FIG. 2. RUNWAY OF NEOFIBER ALLENI AMONG SPHAGNUM AND FERN
Floyd's Island Prairie, Okefinokee Swamp. January 6, 1917. Francis Harper

UNIV. OF MICH.

FOR A METHODIC STUDY OF LIFE-HISTORIES OF MAMMALS

By Ernest Thompson Seton

For long I have believed in and used a prepared schedule for methodic study of life-histories. It has been my lot many times to find a man who did not know how much he knew about a given animal until he was subjected to the dragnet of a schedule process, and the results were surprising and satisfactory, to himself as well as to the questioner.

How much we have lost for lack of this, it would be easy to show. I happen to have before me Audubon and Bachman's account of the northern graysquirrel. The subjects treated in the various sections of its 12 pages are in the following order:

Name	Food
Description	Numbers
Characters	Enemies
Synonyms	Migrations
Description	Numbers
Color	Food
Varieties	Distribution
Measurements	Comparative description
Habits	Various names
Nesting	Description
Pairing	Young
Young	Description
Habits in captivity	Measurements
Rutting season	Distribution
Combats	Color
Food hoards	Description

That is to say there is no attempt at arrangement—no orderly approach; the chapter is merely a mass of undigested observations and raw material; and he has omitted a score of important matters that he certainly knew about. Bachman did justice neither to the graysquirrel, nor to himself. He certainly had ten times the facts about the creature, that one might suppose from his article; and the reason he did not set them down, was I think, because he had no plan of orderly approach. We find this defect in most available life-histories. It seems to me it would be remedied, if each naturalist set out with a plan, such as the one I give herewith, and please understand that this is a mere suggestion. For over twenty years I have used it myself but am ready to drop it as soon as a better one is offered.

PLAN FOR MAKING OBSERVATIONS

Identification (Name)

Names, scientific, English, aboriginal.
Description, generic, specific, subspecific, comparative and anatomical.
Literary history.

Environment (Place)

Range of the species with outlying records, and known changes of same.
Environment or habitat of the species.
Relation to other species of animals or plants.
Home-range of the individual, extent, etc.
Migrations.
Erratic movements.

Physical facts (Body)

Numbers or population, primitive and present.
Senses or special equipment.
Cycles of increase, etc.
Abnormalities, freak developments.
Coat, moults, etc.
Glands.
Protective and directive marks and tricks.
Speed, usual and fast.
Swimming.
Tracks in various gaits.
Scatology, evidence of.
Sanitation in general and in nest.
Bathing.
Sand baths.
Sun baths.
Medication.
Food, full details, commensalism, parasitism, etc.
Storage habits.

Habits (Mind)

Diurnal or nocturnal.
Mating ceremonies.
Marriage, form, duration, etc.
Home-building, kind and number of homes.
Do they make nests or bowers never used for their young?
Gestation.
Young, number, development, family life, relation of father to young.
Do old males become hermits?
Sociability.
Gregarious or not.
Disposition or temper.
Amusements or games.
Aesthetic instincts, love of beautiful, etc.
Curiosity.
Communication, etc.

Modes of signalling.
Voice, various calls and their meaning.
Song, love songs.
Property-instinct.
Hibernation and torpidity.
Habits in captivity.
Morality, vice, crime, suicide, etc.

Enemies, etc.

Diseases and natural mode of treating, etc.
Parasites, internal and external.
Insect pests, and mode of combating.
Rivals.
Enemies of other kinds and modes of defeating.
Age attained, breeding age, etc.
Death of most, due to what?

Strange Instances

Odd partnerships with birds or other creatures.
Unexplained instances.
Abnormalities.

Economics

Service or relation to man.

In all cases give name, place and date. The omission of these have rendered useless a great number of records.

While the above seems a logical sequence, it will frequently prove better to rearrange it for special animals or materials, but each species should be considered under each head, and under other heads suggested by circumstances.

IDENTITY OF THE BEAN MOUSE OF LEWIS AND CLARK

By Vernon Bailey

For over a century the ground beans or wild peanuts taken by the Indians of the upper Missouri Valley from the caches of some little animal have been known and made use of by travellers, explorers, and naturalists, but the animal which laid up these valuable food stores has only recently been identified. It proves to be an unnamed meadow mouse of the *Microtus pennsylvanicus* group.

In 1804 Lewis and Clark obtained from the "Ricaras" (Arikara Indians) "a large rich bean which they take from the mice of the prairie which discover and collect it."[1] Later they reported artichokes taken from the stores of mice by their Indian woman, and while Coues in a footnote credits these stores to pocket gophers, they were more probably the collections of the mice[2] which commonly store the beans, artichokes, and other roots together in underground cavities. Other explorers give passing mention to the mouse stores used by the Indians as food, and writing in 1845 Father De Smet says: "The earth pea and bean are also delicious and nourishing roots found commonly in low and alluvial lands. The above named roots form a considerable portion of the sustenance of these Indians during winter. They seek them in places where mice and other little animals, in particular the ground squirrel, have piled them in heaps."[3]

The extent to which these beans have been used by the Indians as food is evidently greater than has been generally supposed. Some of the Dakotas at Cannon Ball, North Dakota, have told me of gathering several bushels each autumn from the mouse stores, and both Indians and whites greatly prize them as a rich and delicious food. They are large, fleshy beans produced on underground shoots of a trifoliate bean vine, *Falcata comosa*.

The artichokes stored with the beans are the tubers of a wild sunflower (*Helianthus tuberosa*) also growing abundantly on the rich bottomlands of the river valleys. They too are a valuable food and much used by the Indians, and are gathered from the ground where they grow as well as from the mouse collections.

[1] Lewis and Clark Journals, Coues, Vol. I, p. 161, 1893.

[2] Lewis and Clark Journals, Coues, Vol. I, p. 263, 1893.

[3] Life and Travels of De Smet, Vol. II, p. 655, 1905. See also Dr. Melvin R. Gilmore, Uses of Plants by the Indians of the Missouri River Region. Ann. Rept. Bur. Amer. Ethnology for 1911 and 1912, p. 95, 1919.

All efforts to determine which of the fifteen species of so-called mice of that region was responsible for the storing of the beans and artichokes have previously failed. Neither Indians nor white men who were familiar with the mice and their stores could agree on which was the storer even when they were shown specimens of all the species of mice, and their descriptions differed so widely as to add confusion rather than enlightenment.

The Biological Survey field work in North Dakota has usually closed before the storing season begins, but in 1919 the work was so planned that I could remain late and make a special effort to get the mice with their stores. On October 30, at Cannon Ball, I found a small cache of beans and artichokes which I secured and also the mice with them. One was caught in a trap in a runway leading to the cache and one was taken alive in my hands as it ran out of the cavity where the stores were found not far from a soft nest, a few inches below the surface of the ground.

While several other small rodents may also store the beans and artichokes the indications point to this as the one principally concerned in the accumulation of such food stores as are found along the Missouri River valley. Many specimens of these mice had been previously collected, so it was only necessary to connect the species with the stores, and somewhat to my surprise it proved to be a previously unrecognized subspecies of which I already had a description in manuscript. Fortunately this discovery was made in time to give the new form the name long used for it by the Indians.

In working out the range of the *Microtus pennsylvanicus* group in North Dakota, I find specimens from numerous localities from the western part of the State that can not reasonably be referred to the large dark *M. p. pennsylvanicus* of the Eastern States, the little form *M. p. drummondi* of Canada and central North Dakota, nor to the dark gray *M. p. modestus* of the Rocky Mountain Region, although these three forms approach and evidently intergrade. A large pale form, most resembling *modestus*, is found to occupy the badland region of western North Dakota and eastern Montana. It occupies an extensive and well defined faunal subdivision of the Upper Sonoran and Transition Zones in the arid badland area of the northern Great Plains. While the limits of its range have not been fully worked out, the most typical and strikingly marked specimens are from the sagebrush and badland area of the Upper Missouri and Yellowstone Valleys. My first acquaintance with the species was in 1913, when on the side of a badland butte

west of the Missouri River, about 10 miles south of Williston, I caught a specimen which I could not identify. Other specimens in the Biological Survey collection taken at Sentinel Butte, Glen Ullin, Oakdale, Fort Clark, Mandan, Bismarck, and Cannon Ball, in North Dakota; and at Glendive, Wibaux, Ekalaka, Capitol, Elgin, Johnson Lake, near Highwood Mountains, Billings, and Fort Custer in Montana, prove to be of this form. The large series and broad range represented enables me to select a type from a central locality where the characters are comparatively uniform. The subspecies may be known by the following description:

Microtus pennsylvanicus wahema[4] subsp. nov.

BEAN MOUSE

Hetunka of the Dakota Indians (Drs. Beede and Gilmore).

Type, from Glendive, Montana. No. 212370, U. S. National Museum, Biological Survey collection, adult male. Collected by Remington Kellogg, May 8, 1916. Collector's No. 425.

General characters.—In size slightly smaller than *Microtus pennsylvanicus* or *M. p. modestus* and with relatively narrower skull. Conspicuously larger than *M. p. drummondi* and with relatively heavy skull compared with the very delicate, slender skull of that species. Paler than any other member of the group except *M. breweri* of Muskeget Island, which it closely resembles in the general ashy gray tone.

Color.—In short, fresh, summer pelage, back buffy gray; sides clear gray or slightly tinged with buff; under parts, feet, and lower surface of tail light gray or buffy white; upper surface of tail dusky gray. *Winter* pelage long and soft with buffy gray tips to the hairs of upperparts; underparts white or slightly creamy; tail sharply bicolor. In faded winter pelage, color ashy gray with little trace of buffy tinge. *Young* buffy gray, but little darker than adults, except the tails and feet which are more plumbeous.

Cranial characters.—Skull noticeably narrower and slenderer than in *pennsylvanicus* and *modestus*, but almost as long and quite as heavy in structure. Both the braincase and the zygomatic arches are noticeably compressed to give the skull its narrow appearance.

Measurements of type specimen.—Total length, 178 mm., tail vertebræ, 43; hind foot, 20. *Skull:* basal length, 27; nasals, 7.6; zygomatic breadth, 15.4; mastoid breadth, 13; alveolar length of upper molar series, 6.8.

---

[4] Omaha name meaning "to bury," given on the authority of Dr. Melvin R. Gilmore. *Intshunga wahema* "the burying mouse," from this habit of storing food.

A NEW FOSSIL RODENT FROM THE OLIGOCENE OF SOUTH DAKOTA[1]

By Gerrit S. Miller, Jr., and James W. Gidley

Among some fragmentary jaws of *Ischyromys* from the Bad Lands of South Dakota two species are represented; a large-toothed animal resembling *Ischyromys typus* Leidy, but probably related to *Ischyromys chrysodon* (Cope), and a small-toothed form which may be named and described as follows:

Ischyromys parvidens sp. nov.

Type.—Imperfect right mandibular ramus containing all four cheekteeth (pm_4 in place, moderately worn), No. 9134, U. S. National Museum. Collected in the Oreodon Beds of the White River Oligocene, "Bad Lands," Washington County, South Dakota, by J. B. Hatcher.

Diagnosis.—Mandible and teeth in general like those of *Ischyromys typus*, but teeth relatively smaller, the length of the entire toothrow about equal to that of three teeth of the larger animal.

Mandible.—In form the mandible agrees with that of *Ischyromys typus*. It is not thickened as in the species which we suppose to be related to *I. chrysodon*, nor reduced in depth as in *Titanotheriomys veterior*. Region of masseter attachment resembling that of *I. typus* in the position of its anterior border, beneath hind margin of m_1, and in the relative distinctness of its outline (more clearly defined than in the other large-toothed species).

Teeth.—Incisor, so far as can be judged from the fragments, robust like that of the other members of the genus, not slender as in *Titanotheriomys*. Its posterior termination lies against the inner surface of outer wall of the base of the ascending ramus, at alveolar level and separated from posterior border of m_3 by a space about equal to the length of this tooth. In *I. typus* the incisor appears to end at the same point in the jaw, but the large size of the cheekteeth brings the posterior border of m_3 back nearly to a level with it. Size of cheekteeth both actually and relatively much less than in *Ischyromys typus* and resembling that in *Titanotheriomys veterior*. The length of the toothrow slightly exceeds the depth of the mandible at front of m_1 while in *I. typus* it is about one and one-half times this depth. The enamel pattern shows no important peculiarities.

Specimens examined.—Five imperfect mandibles.

Remarks.—The only described member of the family *Ischyromyidæ* in which the teeth are as small as those of *Ischyromys parvidens* is the *Titanotheriomys veterior* of Matthew. In this animal the lower jaw is noticeably more slender than in any of the known species of *Ischyromys*. Hence there should be no difficulty in distinguishing between fragmen-

[1] Published here by permission of the Secretary of the Smithsonian Institution.

tary mandibles. While the material which we have examined is not sufficient to form the basis of a revision of the group it indicates the existence of at least four species as shown in the following key:

Length of first three molariform teeth about $\frac{8.5}{8.5}$

Depth of mandible at middle of m_2, about 8.....*Titanotheriomys veterior*
Depth of mandible at middle of m_2, about 10.....*Ischyromys parvidens*

Length of first three molariform teeth about $\frac{10.0}{10.0}$

Area of muscle attachment in front of antero-external root of pm^4 a well defined, rounded pit.....*Ischyromys chrysodon*
Area of muscle attachment in front of antero-external root of pm^4 an ill defined shallow depression.....*Ischyromys typus*

The form described by Cope as *Colotaxis cristatus* appears to have been based on jaws of *Ischyromys typus* with the narrow-crowned milk premolar in place. We have not seen jaws of true *Ischyromys chrysodon* from Colorado, but those of the nearly related and perhaps identical species occurring in the Bad Lands differ from those of *Ischyromys typus* in their obviously greater breadth; about 7–8 mm. instead of about 5.5 mm. at level of posterior cheektooth.

THE STATUS OF PENNANT'S "MEXICAN DEER"

By Wilfred H. Osgood

[*Plate 4*]

In a brief paper in 1902,[1] I attempted to show that Gmelin's name *Cervus mexicanus*, based on Pennant's Mexican Deer, should be used for the white-tailed deer of the Valley of Mexico. My belief that the name should be regarded as identifiable was based on giving primary importance to Pennant's description and figure of an actual specimen, while Dr. J. A. Allen,[2] who proposed discarding the name as unidentifiable, gave preference to Pennant's first citation, the Teuthlalmaçame of Hernandez. Since there is still no uniformity of usage in regard to the name and especially since I am now able to present a photograph of Pennant's specimen, it seems advisable to restate and amplify my former contention.

In 1771, Pennant,[3] under the vernacular name Mexican Deer, published the following description:

> D. [eer] with strong thick rugged horns, bending forward; ten inches long; nine between point and point; trifurcated in the upper part; one erect snag about two inches above the base: by accident subject to vary in the number of branches: head large: neck thick: eyes large, and bright: about the size of the *European* Roe: color of the hair reddish; when young spotted with white.
>
> Inhabits *Mexico*, *Guiana*, and *Brazil;* not only the internal parts of the country, but even the borders of the plantations: the flesh inferior to that of *European* venison A species very distinct from the Roe of the old continent.

This description was accompanied by a woodcut of a frontlet and pair of antlers showing the characters mentioned and making it perfectly obvious that both description and figure were taken from an actual specimen examined by the describer. There were in addition, as customary, a number of citations of earlier authors including those which Pennant supposed to be based upon the same species of deer as the one he himself had described.

In dealing with names based solely upon citations, it has been the practice to regard one as the primary reference, this usually but not always being the first one, and if this proves satisfactorily identifiable, slight discrepancies in the remaining ones have been disregarded. A

[1] Proc. Biol. Soc. Washington, 15, pp. 87–88, Apr. 25, 1902.

[2] Bull. Am. Mus. Nat. Hist., 16, p. 16, footnote, Feb. 1, 1902.

[3] Synopsis of Quadrupeds, p. 54, pl. 9, fig. 3.

specimen, however, always takes precedence over a citation, unless the description is so drawn from both as to involve a mixture of contradictory or impossible characters. In Pennant's description, there is no incompatible statement[4] and it seems clear that the primary basis of names later applied to it is unquestionably the specimen. This specimen is still in existence in the British Museum where I personally examined it a number of years ago in company with Mr. Oldfield Thomas and Mr. Richard Lydekker who brought it to my attention. At that time I secured the photographs of it reproduced herewith. Its agreement with the figure published by Pennant and with a subsequent one by Hamilton Smith[5] is not absolute in every detail but furnishes such a close approximation as to leave no doubt of its identity. This then is in effect the type specimen and the principal basis of the technical name *Cervus mexicanus* which was first used by Zimmermann in 1777 and later by Gmelin in 1788. It was adopted, principally from Gmelin, by later authors, almost without question, down to 1902 when Allen discarded it as unidentifiable.

The abnormality of the type specimen is of a very common sort among various forms of the white-tailed deer and consists in an increased number of points and unusually heavy beams. The specimen, therefore, is not unidentifiable except in the narrowest sense. As a member of the "virginianus" series of American deer, that is, the white-tailed deer, its identity is unquestionable and, if the name be taken from Zimmermann, as now seems necessary, it is earlier than any other except *virginianus*, to which it yields only page priority.

In the absence of proof to the contrary, it seems necessary to accept Pennant's belief that the specimen came from Mexico. Hence the name must be applied to some form of white-tailed deer from that country. The first use of the name in connection with specimens from a definite locality was that of Lichtenstein in 1827, his specimens being from the Valley of Mexico. Therefore, I proposed in 1902 that this locality be regarded as restrictively used by Lichtenstein. In effect, I designated a type locality, Lichtenstein merely furnished the

[4] If anything was derived from Hernandez, it was doubtless from the text of that author, which, as noted by Lydekker (Deer of All Lands, p. 263, 1898), applies exclusively to a deer, only the figure being composite.

[5] In both figures the antlers are curiously reversed, the right being in the position of the left.

suggestion.[6] This designation, however, is subject to revision if the type proves to belong to a larger form than the one of the Valley of Mexico. Without direct comparison of specimens, it is unsafe to draw definite conclusions, but it seems very probable that the type will prove inseparable from similarly developed specimens of one of the larger, more northern forms, as the Texan or possibly the Louisianan deer, either of which could come under a broad interpretation of "Mexican." This is a matter for decision by the future monographer of the entire group of white-tailed deer. The following measurements were taken from the type: Length of beam over curve, 570 mm.; circumference above burr, 165 mm.; distance between anterior points, $8\frac{3}{4}$–9 inches.

Important citations connected with the history of the names are as follows:

Odocoileus mexicanus Zimmermann

Mexican Deer PENNANT, Synopsis Quad., p. 54, pl. 9, fig. 3, 1771; Hist. Quad. 1, p. 110, pl. fig. 3, 1781—type in British Museum.

Cervus (vel potius) *Capreolus mexicanus*, ZIMMERMANN, Spec. Zool. Geogr. Quad., p. 533, 1777—based on Pennant.

Cervus mexicanus GMELIN, Syst. Nat., 1, p. 179, 1788—based on Pennant; DESMAREST, Mamm., 2, p. 444, 1822—"cette espèce, qui n'est encore comme que par ses bois extrèmement rugueux;" LICHTENSTEIN, Darst. neuer Säugeth., p. 18 and text, 1827—Gmelin's name adopted for specimens from Valley of Mexico; HAM. SMITH, Griffith's Cuv., Anim. Kingd., 4, p. 130, pl. opp. p. 94, fig. 3, 1827—Pennant's type refigured.

Cariacus mexicanus LESSON, Nouv. Tabl. Anim., Mamm., p. 173, 1842; GRAY, Cat. Rumin. Mamm. Brit. Mus. p. 83, 1872—under *C. leucurus*, where it is stated "The horns figured by Pennant are in the British Museum, and were refigured by Hamilton Smith;" BROOKE, Proc. Zool. Soc. Lond. p. 919, 1878—horns figured by Pennant regarded as probably those of "*Cariacus macrotis;*" ALSTON, Biol. Cent. Amer., p. 113, footnote, 1879—"It seems to me more probable that these antlers belonged to *C. leucurus* (Dougl.) which recent American zoologists consider to be a local race of *C. virginianus;* they much resemble the remarkable Nebraska head figured by Baird (Mamm. N. Am. p. 652, fig. 18)."

Cariacus virginianus mexicanus RHOADS, Am. Nat., 28, p. 524, 1894.

Mazama americana mexicana LYDEKKER, Deer of All Lands, p. 261, 1898.

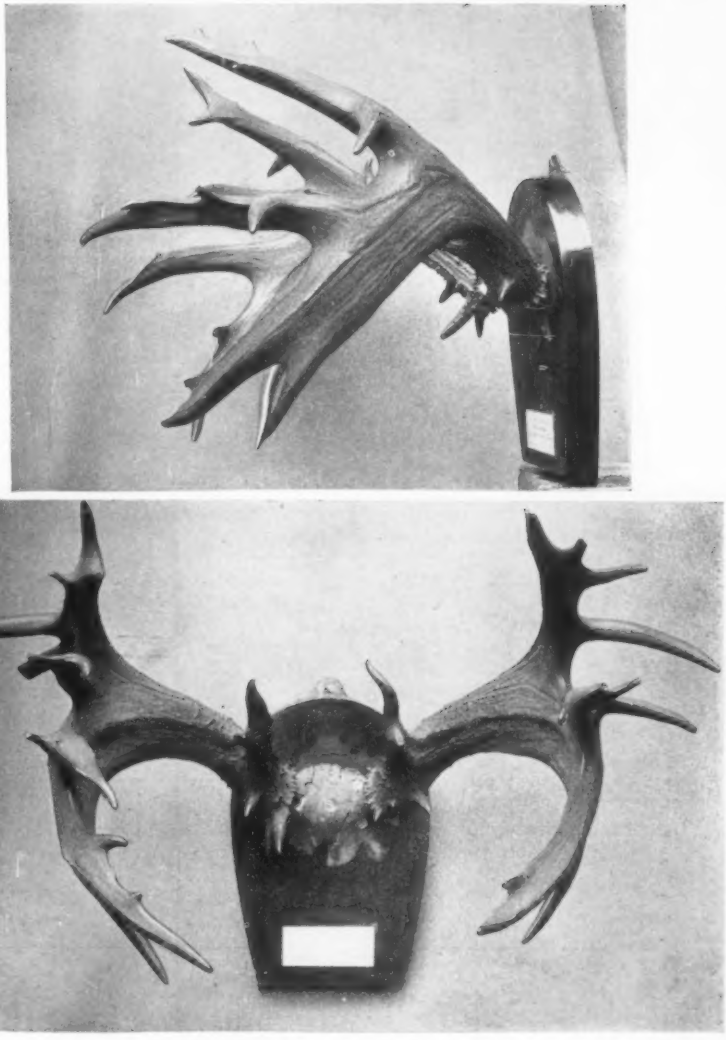
---

[6] It was not intended as some have supposed, that the name should date from Lichtenstein. Compare Allen, Bull. Amer. Mus. Nat. Hist., 16, p. 161, July 1, 1902; Miller, Bull. 79, U. S. Nat. Mus., p. 389, 1912; Lydekker, Catal. Ungul. Brit. Mus., 4, p. 165, 1915.

Dama lichtensteini ALLEN, Bull. Amer. Mus. Nat. Hist., 16, p. 20, Feb. 1, 1902—*Cervus mexicanus* of Lichtenstein renamed.

Odocoileus mexicanus OSGOOD, Proc. Biol. Soc. Wash., 15, p. 88, Apr. 25, 1902; MILLER AND REHN, Proc. Bost. Soc. Nat. Hist., 31, p. 16, Aug., 1903; MILLER, Bull. 79, U. S. Nat. Mus., p. 389, 1912.

Odocoileus virginianus LYDEKKER, Catal. Ungul. Brit. Mus., 4, p. 165, 1915—Pennant's type listed as No. 681, *e*.



ODOCOILEUS MEXICANUS. TYPE SPECIMEN

(Osgood: Pennant's Mexican Deer.)

UNIV. OF MICH.

DESCRIPTION OF A NEW RACE OF THE FLORIDA WATER-RAT (NEOFIBER ALLENI)

By Arthur H. Howell

Attention has already been called by Bangs to the differences existing between typical *Neofiber alleni* of the east coast of Florida and the form inhabiting the fresh water lakes of the interior of the State.[1] Acquisition of a considerable series of specimens from the shores of Lake Okeechobee confirms this opinion and shows the necessity for recognizing this form by name. It may be described as follows:

Neofiber alleni nigrescens subsp. nov.

EVERGLADE WATER-RAT

Type, No. 228,392, U. S. National Museum, Biological Survey collection; adult ♂, skin and skull; from Ritta, Florida (south shore Lake Okeechobee), March 2, 1918; collected by A. H. Howell; original number, 2269.

Subspecific characters.—Similar to *N. alleni alleni*, but coloration more blackish (less brownish) above and more whitish (less buffy) below.

Color.—General tone of upperparts fuscous-black, sometimes with a slight brownish tinge; sides paler, sometimes faintly washed with buffy wood brown; feet fuscous; tail fuscous-black; underparts grayish white, faintly washed with avellaneous, the chin with an irregular patch of fuscous or hair-brown. Young individuals are even darker than adults, being uniform chætura-black above.

Skull.—Not appreciably different from that of *alleni*.

Measurements.—Type: Total length, 328; tail vertebræ, 127; hind foot, 44. *Skull:* Basal length, 43.2: condylo-basal length, 44.8; zygomatic breadth, 27.4; length of nasals, 12; alveolar length of maxillary tooth row, 11.5.

Remarks.—This new race of the Florida water-rat or round-tailed muskrat is represented by a series of 25 specimens from southern Florida; nearly all are from the type locality—Ritta, on the south shore of Lake Okeechobee—but two are from Canal Point on the eastern shore, at the mouth of the West Palm Beach Canal, one from Zona on the North New River Canal, near Fort Lauderdale, and one from the head of Barnes River on the west coast near Chokoloskee. The species doubtless ranges locally throughout the Everglade region, south to Cape Sable, where, on a burnt marsh within half a mile of the coast I picked up several weathered skulls of the animal.

[1] Bangs, O., Proc. Boston Soc. Nat. Hist., Vol. 28, p. 183, 1898.

The habits of this race are quite unlike those of typical *alleni*, as described by Chapman[2] and Bangs.[3] In the Okeechobee region the animals are found, not in ponds or marshes, but in dry or moist peat at a considerable distance from the lake shore. Before the lowering of the lake by drainage canals, however, the water must have extended close to the areas occupied by the rats and probably at times overflowed them.

I could get no positive evidence, however, that these rats ever built houses in the water, as *alleni* is known to do. Their burrows or tunnels were found in both neglected and cultivated fields, in cane patches, and even in dooryards and gardens. In the largest colony discovered, the tunnels ramified the friable peat soil in all directions, but apparently extended to no great depth; only small mounds of peat were found about the entrances. The rats were easily caught in unbaited steel traps or in Schuyler rat traps baited with banana.

In a small, brackish marsh at the head of Barnes River, about 8 miles east of Chokoloskee, I found a small colony of these water-rats and trapped a single specimen. This is the first record from the west coast of Florida, but residents stated that the animals are abundant in similar situations near the head of Turner's River and doubtless all the way down to the coast to Cape Sable. At this locality their tunnels were in wet muck in a part of the marsh containing a dense growth of switch grass with much of the old growth matted down on the ground. Good-sized piles of muck had been scratched out of some of the burrows and in a few cases the holes had been plugged with a round ball of soft muck. Deep trails led from one hole to another, but I could not find that any trails led to the pond a few yards away where cat-tail flags grew abundantly. Many pieces of flag stems, presumably cut by the rats, were floating on the water.

[2] Chapman, F. M., Bull. Am. Mus. Nat. Hist., II, pp. 119–122, 1889.
[3] Bangs, O., Proc. Boston Soc. Nat. Hist., Vol. 28, pp. 182–183, 1898.

NEW RODENTS AND NEW BATS FROM NEOTROPICAL REGIONS

By H. E. Anthony

Upon taking up work on collections of South American mammals accumulated in the American Museum during the past three years, several apparently undescribed forms have been discovered. They are hereby set forth in a preliminary paper, pending a detailed report on the entire collections which will be delayed for some months.

Acknowledgment is made of the kind loan of comparative material by Mr. Gerrit S. Miller, Jr., Curator, Division of Mammals, United States National Museum.

Microsciurus septentrionalis sp. nov.

Type, No. 41235, Dept. of Mammalogy, ♀, Sabalos, on Rio San Juan at junction of Rio Sabalos, Nicaragua, May 12, 1917; collector, Wm. B. Richardson.

Characters.—Similar to *M. alfari* in general appearance but with less rufescent pelage, above and below, and with post-palatal region noticeably longer and molar teeth smaller.

Color.—Upperparts presenting a grizzled olivaceous appearance, the hairs slate black at the base and tipped with honey yellow, top of head slightly more ochraceous; underparts warm buff; tail, above mixed cinnamon-rufous and black, the hairs being banded with alternate bands of each color and tipped with a yellow shade more like that of the light tipped hairs on the back, below very much as above.

Skull.—Like that of *alfari* but with longer palate, the post-palatal notch not reaching to plane of last molars.

Measurements (taken in the flesh).—Total length, 240 mm. (250);[1] tail vertebræ, 100 (120); hind foot, 30 (30); hind foot measured from dry skin, with claws, 37 (37.3). Skull, occipito-nasal length, 33.7; zygomatic breadth, 21.6; breadth of braincase, 18.1; interorbital breadth, 14, length of nasals, 10; length of maxillary toothrow, 5.3.

The Nicaragua squirrel presents rather a puzzling problem as to affinities. Logically it should be closely related to *alfari*, the type locality of which is about 80 miles to the south, but in some characters it more closely resembles *isthmius vivatus* from Panama. The type of coloration of *septentrionalis*, olivaceus in general appearance, is well contrasted with the ferruginous pelage of *alfari* (type specimen) but compared with *isthmius vivatus* this difference is not very great in either the upper or lower parts.

[1] Measurements in parentheses are of topotype.

In skull characters *septentrionalis* more nearly resembles *isthmius vivatus*, as these two forms, of all the Central American *Microsciurus*, alone have the post-palatal region extending beyond the plane of the last molar. This extension of the palate serves to separate *septentrionalis* from all forms but *isthmius vivatus*, but from this latter it is separated by smaller molars.

But two specimens of this squirrel were taken, both at Sabalos, ♂ and ♀.

Dactylomys boliviensis sp. nov.

Text figures 1 and 2

Type, No. 38709, Dept. of Mammalogy, ♀, Mission San Antonio, Rio Chmo re Prov. Cochabamba, Bolivia; altitude 1300 feet, August 18, 1915; collectors, Leo E. Miller and H. S. Boyle. The type is a well prepared skin with a perfect skull, fully mature and with molar crowns well worn.

General characters.—Similar to *D. dactylinus* but somewhat smaller and coloration a uniform olivaceous gray.

Color.—Upperparts, from between ears to base of tail, clothed with very long, lax hairs which are black at the base for three quarters of their length or more, and are tipped with buffy brown along the back and olive-buff on the sides, the general effect being difficult to describe but giving a distinctly olivaceous impression in most lights; crown with a patch of long clove brown hairs that form a sort of a hood extending as far as the ears; vibrissæ very long and black; underparts white to cream colored with narrow encroachments of the grizzled hair from the sides. Forelegs above, like rest of upperparts; below, like breast. Hind limbs, along inside and upper surface, cinnamon buff; below like belly. Tail very long, practically naked and scaly except for space of about 60 mm. at the base, where the long hair of the back extends down onto the tail and is black in color, the tips of the hairs cream color.

Detailed characters.—Toes, five[2] in front, five behind. Ears small, sparsely haired, almost hidden in long hair of head. Eyes small, with a tuft of long vibrissæ arising just posterior to the eye.

Skull.—Large and strongly built; nasals widening rapidly anteriorly, terminating almost in same plane with premaxillæ; superior outline of skull very flat; maxillary toothrows converging anteriorly almost to the midline; posterior portion of palate built out by a thin shelf-like extension of post palatal region; pterygoid processes very long, slender and meeting the auditory bullæ; other skull characters and mandible normal for the genus.

Measurements (taken in the field).—Total length, 710 mm.; tail vertebræ, 410; hind foot, 60; greatest length of skull, 74.1; condylobasal length, 70.6; zygo-

[2] The fifth toe of the fore foot is so small that a lens is required to distinguish it with certainty. It consists mainly of a vestigial claw set in the plantar tubercle that formerly lay at the base of that toe.

matic breadth, 34; length of nasals, 21.5; greatest breadth of frontals, 22.5; greatest breadth of braincase, 23.2; length of palate, postpalatal notch to posterior border of incisive alveolus, 35.2; length of molar toothrow, 17.7; greatest length of mandible, 51.2; length of mandibular molar series, 18.3.

This new form of *Dactylomys* is noticeably different from the one specimen of *D. dactylinus* in the museum collections, and as nearly as I can judge from the literature on the genus, from any hitherto described form. A specimen of this genus, taken at Villavicencio, eastern

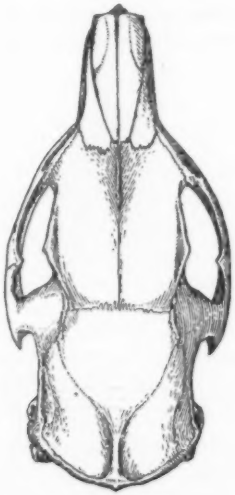


FIG. 1. TYPE OF DACTYLINUS BOLIVIENSIS, No. 38709, NATURAL SIZE

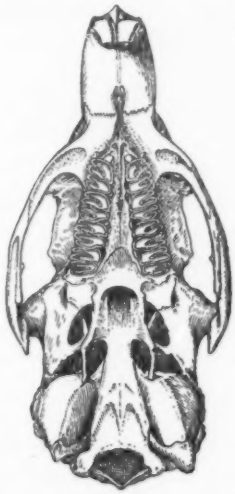


FIG. 2. TYPE OF DACTYLOMYS BOLIVIENSIS, No. 38709, NATURAL SIZE

base of the Andes, Colombia, was identified by Doctor Allen[3] as *dactylinus*, with which it agrees in all characters of specific importance as well as can be expected when the basis for comparison is the short type description of Desmarest.[4] Later authors have not extended Desmarest's account very appreciably.

The Bolivian specimen, compared with this specimen of *dactylinus*, is much more olivaceous in coloration, lacks the reddish brown at the

[3] Bull. Amer. Mus. Nat. Hist., XXXV, p. 208, 1916.
[4] Nouv. Dict. H. N., X, p. 57, 1817.

base of the long hairs on the back, has much less ochraceous on the flanks and hind limbs, and differs particularly in skull characters in the greatly extended post palatal region. The enamel pattern of the molars is practically identical in *dactylinus* and *boliviensis*.

The palate of *D. typus* [= *D. dactylinus*] figured in the Revue et Magasin de Zoologie for 1852, plate 16 (text figure 4), shows that the postpalatal region in *dactylinus* (text figure 3) is much shorter than in *boliviensis* and the same as in the museum specimen from Villavicencio.[5]

Dactylomys dactylinus canescens, described by Thomas in the Annals and Magazine of Natural History for 1912, page 87, is of the *dactylinus* type with "rusty color of under fur strongly marked along the

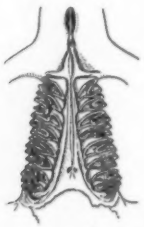


FIG. 3. PALATE OF DACTYLOMYS DACTYLINUS, No. 34594, NATURAL SIZE

FIG. 4. PALATE OF DACTYLOMYS TYPUS [=D. DACTYLINUS], COPIED FROM REVUE ET MAG. DE ZOOL., 1852, NATURAL SIZE

middle dorsal area." The skull of *boliviensis* is smaller than that of *d. canescens*, Thomas's measurement of upper tooth-series being 21.5 mm. as against a length of 17.7 in *boliviensis*.

The type is the only specimen of this species secured.

Chrotopterus colombianus sp. nov.

Type, No. 38966, Dept. of Mammalogy, sex indet., Rio Quatequia, near Bogota, Colombia; collector, Hermano Apolinar Maria. The type is a complete skin with skull, the pelage being in good condition but the bones of both forearms are broken and not measurable. The type locality is on one of the upper tributaries of the Rio Meta about fifty miles to the east of Bogota.

Characters.—Size about as in *auritus* but darker brown above, yellowish brown instead of gray below, and tragus quite broad and blunt.

---

[5] The Villavicencio specimen has the posterior margin of the palate somewhat broken, so that the exact extent of the palate may be only approximated.

Color.—Above, everywhere uniform Mars brown of Ridgway, the hairs minutely tipped with whitish and with the extreme bases lighter, on the neck and behind the ears the white at the base of the hairs is much more extensive and produces a lightening in the external color; below the hairs are snuff brown except for an irregular median area of cream buff and an extensive area on the throat and chest which is cream buff; membranes naked, brownish black, with only a very slight whitening at the tip of the middle finger.

Ears.—Very large and broad, with numerous transverse, arcuate plications; tragus broad, with thickened anterior border and with single notch on anterior border and one tooth on posterior border, lacking the serrations seen in *auritus*.

Skull.—Similar in all details to that of *auritus*.

Measurements (from dried skin).—Total length, approximately, 115 mm.; tail vertebræ, 40; hind foot, with claws, 16.3; forearm, estimated from two fragments, 84; height of ear from base of tragus, 28.2; height of tragus, 8.5; greatest breadth of tragus, 4.3.

Skull.—Breadth of braincase, 10.6; least interorbital breadth, 4.2; zygomatic breadth, 13.2; breadth of palate across m^3, 9.0; length of upper toothrow, c-m^3, 9.4; length of mandible, 16.6; length of lower toothrow, c-m_3, 10.7.

Colombianus is readily distinguishable from *auritus* not only by the marked difference in color but by the much wider, thicker tragus, which lacks the serrated margins seen in Peters's figures[6] and also noticeable in a specimen of *auritus* from Bonda, Colombia. The lack of white on the wing tips serves to separate it from *auritus guianæ*,[7] while *auritus australis* described in the same paper as the foregoing species, evidently has the same color pattern as *auritus* since Thomas makes no mention of any color difference and bases the separation of the new subspecies upon the amount of white on the wing tip.

In the color pattern of the under parts, the throat and abdomen being lighter than the adjacent regions, is seen a possible approach toward the white throated species, *C. carrikeri*. *Carrikeri*, however, differs conspicuously from *colombianus* in color and also in details of ear structure, having a smaller ear and more slender tragus.

Histiotus inambarus sp. nov.

Type, No. 37194, Dept. of Mammalogy, ♀, Peru, Rio Inambari (70° 15′ W., 13° 55′ S.), altitude 2200 feet, March 12, 1915; collectors, Messrs. H. and C. Watkins. The type is a skin in fair condition with a slightly crushed skull.

General characters.—Similar in size and general characters to *Histiotus macrotus* but coloration paler, ears narrower and less convex along inner margin.

Color.—Above uniform Saccardo's umber, the hairs noticeably darker at the

[6] Abhandl. k. preuss. Akad. Wissensch. Berlin, 1865, p. 305.

[7] Ann. and Mag. Nat. Hist. (7), XVI, p. 308, 1905.

base, and with small postauricular patches of much lighter colored hair which are the same color as the underparts; below, everywhere light buff of Ridgway, the hairs darker at the base. Ears and membranes black.

Ears.—Very large and broad; connected by a very low ridge, scarcely discernable on the crown; inner margin well rounded at base but not conspicuously so; outer margin evenly convex from tip to base; tragus very tall, simple. Ears crossed by a number of transverse folds which appear as fine lines, seven visible on the upper and eight on the lower side.

Skull.—Normal for the genus.

Measurements.—(compared with those of *velatus*, in parentheses): Total length, 108 mm. (112); tail vertebræ, 52 (55); height of ear from base of tragus (dried skin), 26.7 (24.3, *macrotus*, 26.3); greatest breadth of ear, 17.7 (19.4, *macrotus*, 19.1); length of forearm, 48.3 (46.8, *macrotus*, 43.3).

Inambarus most closely resembles *macrotus* from which it may be readily distinguished, however, by its lighter color and differently shaped ear. The ear of *macrotus* has a wide and abrupt expansion at the base on the inner margin, in this respect only exceeded in the genus by *velatus*. The ear of *inambarus*, however, is more evenly rounded at the base of the inner margin and is somewhat narrower, especially at the base, than in *macrotus*. Also the ear of the new species is very black, contrasting with the yellowish color of the ear in the only adult specimen of *macrotus* available for comparison. As this specimen of *macrotus* is an alcoholic perhaps too much stress had best not be made on this point.

Inambarus differs even more apparently from *velatus* and *montanus* in coloration and ear characters than it does from *macrotus*.

GENERAL NOTES

RED BAT AND SPOTTED PORPOISE OFF THE CAROLINAS

Fragmentary observations at sea are frequently worth recording for want of more complete data. September 3, 1919, the writer was bound south on the coastwise steamer "Arapahoe." We rounded Diamond Light-ship, North Carolina, in the early afternoon. About an hour after sunrise, approaching the Capes of the Carolinas from the North, no land yet in view, a red bat (*Lasiurus borealis*) was observed darting about ship in erratic fashion, looking for cover. It settled between two booms at the break of the forecastle, but was promptly driven out. Later in the day a bat was seen once or twice about ship, probably the same individual. The preceding afternoon, standing to sea from New York, there had been calms and light airs, the weather more or less thick, with a dull grey sky. September 3 was clear, with a north-west breeze, rather light. This bat, doubtless a migrating individual, could then not have been driven off-shore by heavy weather. It was likely following its regular migration route southward, across the water.

In the afternoon, having passed well south of Diamond Light-ship, a number (perhaps 35) of spotted porpoises (*Prodelphinus plagiodon*) were observed. As many as ten or a dozen occurred together; jumping clear of the water, low; and also "rolling." Some came close along-side where one could see them swimming under the clear water, or lolling there, before they broke. They appeared very dark above with pale bellies. Nearby the purplish cast and the spotting were conspicuous. In one case one was accompanied by a smaller grey porpoise swimming close beside it, which looked like *Delphinus*.

—*J. T. Nichols.*

New York City.

THE COYOTE NOT AFRAID OF WATER

My theories regarding the aversion to water shown by the coyote were upset recently while on a trip to the Imperial Valley, in the desert region of southeastern California. A visit was made to Salton Sea, a large alkaline lake, and to some islands on the western shore, where numerous colonies of pelicans and cormorants are to be found each spring. The islands are really sand dunes which do not rise more than ten or fifteen feet above the surface of the sea. Each island is separated from its neighbor by a narrow channel of water which may be shallow enough to wade, or it may be eight or ten feet deep. On one island I was greatly astonished to find the fresh tracks of a coyote (*Canis ochropus estor* Merriam), so situated as to indicate that the animal had swum a channel about 30 feet wide and 8 feet deep. The tracks showed plainly where it had come down at one side of the channel, had entered the water, crossed to another island, made the circuit of that island, and then returned across the strip of water. Water from the shaggy coat had run down the legs into the footprints and there was evidence also that the animal had shaken itself. Upon following the tracks, I discovered that it had feasted upon two mudhens, the remains of which it had buried after the flesh had been picked clean from the bones. This particular island was separated from another one by a channel about 2 feet in depth and 22

feet in width. Here again the tracks showed unmistakably how the animal had entered the water and come out on the other side.

It therefore appears that narrow channels of water formed no barrier during the food-getting expeditions of this particular coyote, and it may be that much of the depredations on ducks' nests which have been attributed to racoons because of their fondness for water may in reality be due to coyotes, who may not be so averse to swimming as some persons have believed.

—*Harold C. Bryant.*

THE FLORIDA SPOTTED SKUNK AS AN ACROBAT

April 13, 1919, while engaged in field work for the Biological Survey in Lee County, Florida, I established camp on a small prairie dotted with clumps of palmetto scrub close to an arm of the "Big Cypress" known as Kissimmee Billy Strand—being approximately 25 miles southeast of Immokalee. Shortly before sunset, as I was walking along a cow trail close to a palmetto thicket a Florida spotted skunk (*Spilogale ambarvalis*) suddenly appeared in the trail, not over 10 or 12 feet in front of me, standing *erect on his fore legs*, with his hind legs spread in a most threatening attitude. I did not see him assume this position, and he maintained it only for an instant, quickly resuming his normal position and disappearing in the brush, leaving only a slight odor behind. Apparently he, as well as I, had been taken by surprise, but just what his purpose was in striking this ludicrous attitude I am unable to say. My guide, Mr. J. M. Youmans, who has hunted extensively in this region, told me he has occasionally seen a similar performance by this skunk. A trap set in the scrub resulted in capturing the little acrobat next morning.

This species is essentially a prairie dweller and was found to be common over a large part of Lee County, probably reaching its southern limit not far from the locality mentioned above. On a previous trip I captured a specimen at Arcadia in the mouth of a pocket gopher's burrow after he had entirely devoured a trapped gopher (*Geomys tuza*). I learned also of the occurrence of the species at Palma Sola, on the Gulf coast of Manatee County. On the east coast, the species ranges south (rarely) to Lemon City and Cocoanut Grove.

—*Arthur H. Howell.*

THE FELIS OCELOT OF HAMILTON SMITH

In his important paper on the nomenclature of the small spotted cats of tropical America (Bull. Amer. Mus. Nat. Hist., vol. 41, pp. 341–419, Oct. 3, 1919), Dr. J. A. Allen has concluded after extensive discussion that if *Felis ocelot* H. Smith "is taken seriously it can only be construed as a synonym of *Felis pardalis* Linné." Should there be any doubt as to the correctness of this opinion, it may be noted that Smith's name is preoccupied by *Felis ocelot* Link, 1795 (Beytr. Zool., 2, p. 90), which is an undoubted synonym of *Felis pardalis* Linnæus.

Hamilton Smith described four varieties of his *Felis ocelot*, respectively numbered 1, 2, 3, and 4. Of these, No. 4 was identified with *Felis pardalis* Linnæus by Griffith in 1827 and has not been named subsequently; No. 1 was named *Felis chibigouazou* also by Griffith in 1827; No. 2 was called *Felis hamiltoni*, and no. 3

Felis griffithii, both by Fischer in 1830. Variety No. 2 was renamed *smithii* and No. 3 *canescens* by Swainson in 1838 (Anim. in Menag., pp. 120–121). Smith expressed the opinion, unsupported by any direct evidence, that Nos. 1 and 2 were South American and Nos. 3 and 4 Mexican. The names based on them have been allocated largely on the strength of this statement as to localities for the descriptions and figures offer little in the determination of forms known to be variable and at best only subspecifically separable. Thus Allen has regarded the two names based on Nos. 1 and 2 as South American and synonymous, recognizing *chibigouazou*, the earlier one, and placing *hamiltoni* as a synonym of it. In dealing with the Mexican ones, however, he has recognized two forms (*griffithii* and *pardalis*) representing Smith's Nos. 3 and 4. In this he was doubtless influenced by the grayish color ascribed to Smith's specimen of No. 3. In view of the great variability in the group, as fully noted by Allen, and in consideration of the nature of the case, which is not one of distinct species but of intergrading subspecies of which even actual specimens may be difficult to determine, it would seem desirable to place *griffithii* as a synonym of *pardalis* on much the same grounds that *hamiltoni* is placed under *chibigouazou*. By so doing, *albescens*, which is already well established for the form of northeastern Mexico and the south-central United States, would be retained.

Even the recognition of *chibigouazou* seems open to question, for at least two earlier names of possible pertinency are to be considered. These are *Felis maraqua* Link, 1795 (Beytr. Zool., 2, p. 91) and *Lynx brasiliensis* Oken, 1816 (Lehrb. Naturg., Zool., 3, p. 1050). The first is described as follows: "*F. maraqua*, cauda elongata, corpore luteo, dorso nigro striato, lateribus nigro-maculatis." The word *maraqua*, used by Link as a specific name, seems to be a variant of one of the Brazilian names for cats of the *pardalis* group; therefore, it carries the implication that the description was derived from some previous account of one of these animals. However, the source of the name is not indicated otherwise and the description itself is so brief and so generalized that it might apply to any of several species. Like many other names, it is not wholly unidentifiable, for at least it refers to a South American spotted cat. It may therefore, be synonymized with any definitely identifiable earlier name for such a cat, as for example, *Felis tigrina* Schreber, 1777. To attempt to establish it in use would only be justified in case it was the earliest name applied to any cat having the characters mentioned.

Turning to Oken's name *Lynx brasiliensis*, we find a description of considerable detail with measurements and association with the native name *mbaracaya*. Although the source of this native name is not cited by Oken, the large use which he has made of Azara's work on the quadrupeds of Paraguay in other cases makes it probable that the name was obtained from that work. The probability is greatly strengthened by comparison of Oken's description and Azara's text which show numerous points of similarity. There is nothing in Oken's description which cannot be found in Azara except the measurement of total length, given as 22 inches, an obvious error, probably a misprint for 42 inches, the dimension given by Azara. The tail length of 13 inches is given by both authors. The evidence is thus convincing that Oken's *brasiliensis* was based on Azara, who states definitely (Quad. Paraguay, 1, p. 152, 1801) that the *mbaracaya* is the same as the *chibigouazou*. Hence the technical name *chibigouazou* should be supplanted by *brasiliensis*.

From the foregoing, therefore, it is concluded (1) that *Felis ocelot* Smith is preoccupied and wholly untenable, (2) that *Felis griffithii* Fischer is a synonym of *Felis pardalis* Linnaeus, (3) that *Felis maraqua* Link is not fully identifiable and may be disposed as a possible synonym of *Felis tigrina* Schreber, and (4) that *Felis chibigouazou* Griffith is a synonym of *Lynx brasiliensis* Oken which becomes *Felis* (*Leopardus*) *pardalis brasiliensis*, the first tenable name for a South American cat of the *pardalis* group. Thus not only the troublesome *Felis ocelot* goes out of use, but also all the names based on the so-called varieties associated with it by Hamilton Smith. —*Wilfred H. Osgood.*

NOTE ON GUELDENSTAEDT'S NAMES OF CERTAIN SPECIES OF FELIDÆ

Recent investigations of the African Felidæ have led me to the consideration of the nomenclature of the *caracal* group, and especially to the alleged "*Felis caracal* Gueldenstaedt."[1] Although Gueldenstaedt's names were given correct binomial form by nearly all subsequent authors they are not binomial in Gueldenstaedt's text. The first author known to me to have challenged their acceptance is Matschie, in a paper on the caracals published in 1912,[2] in which he states that Gueldenstaedt's names cannot be accepted because they are none of them binomial. To demonstrate the correctness of Matschie's claim it is only necessary to quote Gueldenstaedt's diagnoses, which run as follows:

"Lynx: Felis auriculis apice barbatis; capite et corpore albido-ruffo, nigro maculato; cauda obsolete annulata, apice nigra;

"Felis ruffa: Felis auriculis apice barbatis; capite ruffo, fronte et temporibus nigro striatus; corpore ruffo, fusco maculato; cauda subtus et apice alba, supra nigro fasciata;

"Caracal: Felis auriculis apice barbatis, extus nigris; capite, corpore et cauda unicoloribus fuscentibrunneis;

"Chaus: Felis auriculis apice nigro barbatis, extus brunneis; capite, corpore et caudæ basi unicoloribus, fuscenti-luteis; cauda apicem versus albido et nigro annulata, ipso apice nigro."

The second of these species, "Felis ruffa," has the appearance of being binomially named, but a reference to the preceding context on the same page (page 499, second paragraph[3]) is sufficient to show that this is, as well as "Lynx," "Caracal," and "Chaus," a vernacular name, not a technical one, it being simply the rufous cat; in other words, the "Bay cat" of Pennant translated into Latin, the language in which Gueldenstaedt's paper is written.[4] In other parts of his

[1] Chaus, animal deli affine descriptum. Auctore A. I. Gueldenstaedt. Novi Comm. Acad. sci. imp. Petropolitanæ, XX (for 1775), 1776, pp. 483–500, pls. xiv, xv, animal and skull of the Chaus. Diagnoses of four species, pp. 499–500.

[2] Über einige Rassen des Steppenluchses *Felis* (*Caracal*) *caracal* (St. Müller). Von Paul Matschie. Sitzungsb. Ges. naturf. Freunde Berlin, 1912, pp. 55–67. Comment on Gueldenstaedt's names, pp. 56–57.

[3] "A Fele ruffa facile distinguitur," etc.

[4] "Addidit nuper Zoologus his acutissimus (vid. sp. 136. in Synops. of Quadrup.) animal americanum Lynci proximum, quod illi Felis ruffa (bay cat) dicitur. Addamus nunc alterum animal asiaticum Caracali adeo cognatum, ac Felis ruffa Lynci, quod á nobis Chaus appelator." (Op. cit., p. 484.)

memoir Felis ruffa is also unmistakably used as a vernacular name in the same way as lynx, caracal, and chaus. In the summary of this paper (op. cit., p. 62) these cats are enumerated as "Lyncis Auctorum, Felis ruffæ Pennanti, Caracalis Buffonii et Chai nostri." Gueldenstaedt's Lynx is the *Felis lynx* Linné; his Felis ruffa is the Bay Cat of Pennant, the "*Felis rufa* Gueldenstaedt" as rendered by Schreber; his Caracal is primarily the Caracal of Buffon; his Chaus is the "*Felis chaus* Gueldenstaedt," as rendered by Schreber. Schreber, in Theil III of his Säugthiere, in the part issued in 1777, is the first author to misquote Gueldenstaedt's vernacular names, thus giving them the form and status of properly constructed binomial technical names, and they have been accepted as such by subsequent authors who have apparently, almost without exception, taken them from Schreber without verification. It thus happens that the North American bay lynx still carries in our latest publications the technical designation *Lynx ruffus* (Gueldenstaedt), although the correct authority for the name is Schreber, who first gave it form, changing the specific name *ruffa* to *rufa*. The name of the bay lynx should therefore be *Lynx rufa* Schreber.

As of bibliographic interest, it may be mentioned that Gueldenstaedt's paper is not cited by Erxleben in his "Systema Regni Animalis," published early in 1777. —*J. A. Allen.*

THE WOOD RAT AS A COLLECTOR

It is of course well known that wood rats of the genus *Neotoma* carry away and put in their nest piles almost any trinket or small article which they find. Doctor Mearns records the fact that the white-throated wood rats of southern Arizona (*Neotoma albigula*) gather together sticks, stones, cow-dung, bones, bits of glass, plants, seed-pods, and similar materials, and on one occasion, when he was spending the night of April 19–20, 1888, in a cabin in Bloody Basin, Arizona, they carried off some boxes of pills. Hen's eggs, powder boxes, candles, cakes of soap, potatoes, Indian corn, seeds of various wild plants, juniper berries, and joints of cactus were some of the materials found in their stores. (Mammals of the Mexican Boundary, Bull. 56, U. S. Nat. Mus., 1907, pp. 477–480.)

Through the courtesy of Miss Crissie Cameron of Tacoma, Washington, a member of the Committee on Biological Survey Coöperation of the Mountaineers Club, we have been favored with the following notes on the collecting activities of an individual western bushy-tailed wood rat (*Neotoma cinerea occidentalis*). This animal had its nest in a box on some rafters in the girls' dormitory of the Mountaineers' lodge near Snoqualmie Pass, in the Cascade Mountains in Washington. A bushel of articles had been gathered by the industrious rats. "The nest was made of oakum pulled from the chinks in the cabin and lined with what appeared to be wool or cotton pulled from a comforter. The nest measured 6 inches in diameter on the inside and 8 inches on the outside."

The nest and box contained the following articles:

rags, chewed up	apple core
leaves and grass, considerable quantity	onion peel
paper, chewed up	bacon rind
thumb of glove	raisins
string, pieces	chocolate, 10 bars
thongs	figs

oakum	scone
puff balls	candles, 19 pieces
coin, one dime	potatoes, 4
newspaper clipping on prevention of forest fires	dried apricots
	soap, several cakes
coffee can cover 4 inches in diameter	lemons
paraffin from jelly glass	mushrooms
bread crusts	beans
bones	peanuts
meat scraps	banana
cantaloupe rind	sugar, 15 lumps

Miss Cameron writes that the box containing the nest was removed, and a home-made box trap put in its place, but that the wood rat avoided the spring, and industriously set about collecting a quantity of materials for another home.

—*Walter P. Taylor.*

A NOVEL NESTING PLACE OF THE RED-BACKED MOUSE

On September 7, 1919, in Sunset Park, Mount Rainier, Washington, I stowed a dunnage bag containing clothes and miscellaneous articles beneath a thick conifer to keep off the wet. Two days later I had occasion to get into it. Reaching inside, I felt something clinging to my hand, and looking down, I was surprised to see a mother red-backed mouse (*Evotomys gapperi saturatus*) with one young one clinging to one of her teats, and another but just let loose. On investigating further two more young were found. The mother had evidently regarded my dunnage bag as an exceptionally dry log with a wonderfully cosy interior, and had given birth to her four young there. It is of interest that we found red-backed mice breeding in Mount Rainier National Park from early in July until the middle of September. —*Walter P. Taylor.*

THE RANGE OF THE HOARY MARMOT IN MONTANA

The Montana hoary marmot (*Marmota caligata nivaria*), according to Howell, occurs in two comparatively small areas, one in northwestern Montana, covering approximately what is now the Glacier National Park, and the other in Idaho, in portions of the Bitterroot and Salmon River Mountains (North American Fauna, No. 37. Revision of the American Marmots, pp. 66 and 67). I find that I have a few observations, made in Montana several years ago, that increase this range somewhat. While I paid no great attention to mammals at that time, and did not collect specimens, such an animal as the hoary marmot is so conspicuous, so easily observed and so unmistakable that there can hardly be doubt as to the species, though the subspecies, of course, might be in question.

On September 8, 1909, while crossing the continental divide at a point in Deer Lodge County, Montana, I observed two of these animals, and heard their shrill whistled call. I was in the company of Mr. J. S. Baird of the Forest Service at the time. Neither of us had ever seen such an animal before, or heard of one. When we described it to rangers of the Deerlodge National Forest, none of them knew it, which leads me to believe that it cannot be common in that part of the

state. The point where the animals were seen was at the head of Ten-mile Creek, a tributary of the Big Hole River, just south of the continental divide, which in this part of the state runs east and west. This locality is probably an eastward extension of the Idaho area of the range of this species, for almost continuous high mountains extend from this point west to the Bitterroot Mountains.

Nearly two years later, in the summer of 1911, I again saw this animal, and in this and the next summer became fairly familiar with it. The locality this time was in the mountains of Teton County, Montana, just south of the Glacier National Park. Here in the headwaters of Birch Creek, and the Teton and Sun Rivers the marmot was found in small numbers, though by no means as commonly as in the Glacier Park. The southernmost point at which I observed it here was at the head of Indian Creek, a tributary of the West Fork of the Sun River, in northern Lewis and Clark County. Some of the forest rangers in this vicinity reported them on the head of the Dearborn River, which is still somewhat farther south. This area is obviously an extension southward of the more northern area of the range of this species, though the two areas are separated by a gap of a few miles just south of the Glacier Park, where there are no high mountains.

It is not probable that the southern and northern areas of the range of this species are connected along the continental divide, for the mountains between the head of the Dearborn River, and those of Deer Lodge County are mostly low in elevation, with only a few small areas that extend above the Canadian zone.

—*Aretas A. Saunders.*

RODENT MOUNTAINEERS

In the course of investigations by the Biological Survey party on Mount Rainier during the summer season of 1919 several rumors were heard of mammals observed on the summit of the mountain. These were uniformly questioned by us until finally a white-footed mouse (*Peromyscus maniculatus oreas*) was actually secured. It was forwarded to the Honorable Roger W. Toll, superintendent of Mount Rainier National Park, who skinned and saved the specimen. An affidavit accompanying the skin certifies to the fact that the mouse was found and killed August 8, 1919, at Register Rock, one of the high points on the mountain, 14,100 to 14,200 feet altitude. The affidavit is signed by two guides and four climbers, all members of the summit party.

At a later date Mr. and Mrs. William L. Finley of Portland, Oregon, made the ascent of Mount Rainier and saw a little chipmunk (*Eutamias amœnus* subsp.) on the summit.

On August 6 a climbing party of the Mountaineers and the writer observed a Douglas squirrel (*Sciurus douglasii*) playing about in the rocks apparently very much at home no less than 2500 feet above timberline at Camp Curtis on the north side of the mountain. Later in the day one squirrel was seen and another heard at the summit of Steamboat Prow, 9700 feet high; and on the following day, in company with a party of the Mountaineers, en route to the summit of Mount Rainier via Emmons Glacier, the writer saw a Douglas squirrel at an altitude of approximately 10,500 feet. This squirrel was on the snowy surface

of the glacier, far from any rocks or earth. He was tripping downhill as if he had just been to the summit and was enjoying the experience hugely.

At Camp Muir, 10,000 feet, on September 26, the writer caught white-footed mice (*Peromyscus maniculatus oreas*), western bushy-tailed wood rats (*Neotoma cinerea occidentalis*) and the large-footed meadow mouse (*Microtus richardsoni arvicoloides*).

The occurrence of the large-footed meadow mouse at Camp Muir is perhaps the most striking record of all. Ordinarily dwelling in moist alpine parks and meadows at an average altitude of 5500 feet, this animal has here climbed to a height of 10,000 feet, or approximately 3500 feet above the tree line. Instead of pleasant meadow country with an abundance of water and herbaceous vegetation, the mouse here encounters rocks, furious winds, snow and ice, and has only lichens and a very few hardy plants on which to feed. The mouse was captured under the wall of a stone cabin. That he was hard pressed for food may be indicated by the fact that his stomach contained a piece of an old woolen sock.

The altitudes attained by the mammals on Mount Rainier are not so remarkable in themselves, for it is well known that several mammals attain the summit of Mount Whitney, California, 14,504 feet, the highest point in the United States south of Alaska. The chief interest is in the fact that while timberline on Mount Whitney averages perhaps 11,500 or 12,000 feet in altitude, the trees on Mount Rainier stop at an average altitude of 6500 feet. Thus the mammals seen on the summit of Rainier had climbed between 7000 and 8000 feet above timberline.

—*Walter P. Taylor.*

DOES THE CUTEREBRA EVER EMASCULATE ITS HOST?

In the early 50's, Dr. Asa Fitch, State Entomologist of New York, was frequently informed by the hunters in the vicinity of Lakeville, New York, that at least one-half of the male squirrels of all the species found in the country were castrated. Some thought that jealous rivals of the same species did it, and some blamed the redsquirrels for all this maiming.

In August 13, 1856, Doctor Fitch had sent him a chipmunk in whose scrotum was a bot-fly grub. He says (N. Y. State Entom. 3rd Ann. Rept., 1857, Supp., p. 479): "I find the fleshy glandular tissue of the testicles wholly consumed, nothing of them remaining but their empty outer skin. . . . . There are some hunters, however, that say they have found two grubs in the scrotum of some Squirrels, and they conjecture that it is by these that the testicles are destroyed." . . . . "From what has now been stated I think that everyone will agree with me in the opinion, that it is by this fly that the Squirrels in our country are emasculated" (p. 482).

In 1889 Dr. C. Hart Merriam contributed to "Insect Life," vol. 1, p. 215 (U. S. Dep. Agr.) a paper containing the following facts: He had frequently found the *cuterebra* in or near the scrotum of the graysquirrel, the redsquirrel, and chipmunk. On the 7th and 8th of October, 1885, he killed more than 50 chipmunks at the south end of Lake Champlain and found fully one-half infected with *cuterebra*. More females than males were thus afflicted. The "warbles" were anywhere from the umbilical region to the genitals; in a few cases they were in the axilla, and in one or two in the upper part of the foreleg; a number had 2, some had 3 of the bots.

Doctor Fitch, and most of those who have followed after him, have assured us that the bot emasculates the host. *Does it?* The evidence is far from convincing.

1. We have proof that a bot develops under the skin of all of our squirrels; that it often appears in the scrotum of the male; but is as often found in other parts of the body, and in the female as much as in the male.

2. No trace of the testes is discernible after the development of the grub. Why should there be? For at the season of all observations—August, September, and October—the testes are normally reduced to almost nothing and are even, as Bachman says (Vol. 1, p. 269), "drawn into the pelvis."

3. There is no proof that the bot eats fibrous tissue, or anything but juices.

4. It is contrary to the known ways of evolution, that any species should develop a habit that would tend to cut off its own food supply.

5. The final proof has never yet been offered, namely—a male, apparently emasculated by the grub, kept over till next rutting season for observation. I strongly suspect that such males would surprise us by appearing on time, fully equipped, with two perfectly good, functioning testicles, that had been safely tucked away in their original nest inside the pelvis; evidencing that the only harm the bot-fly warble did, was the temporary drain while the host was carrying it. No one yet has reported one of these squirrels taken in the rutting season of its species, and obviously castrated.

A friend of mine, who had the ill-luck to develop a bot-warble in the calf of his leg, tells me that at times, when the creature was turning over, or in some way moving, the irritation was maddening.

The following species are known to be infected by the bot-fly or warble: gray-squirrel, foxsquirrel, redsquirrel, Eastern chipmunk, striped groundsquirrel, Richardson groundsquirrel, Franklin groundsquirrel, least vole, housemouse, jack-rabbit, etc.

Perhaps some reader has made observations that will decide this question.

—*Ernest Thompson Seton.*

THE FLYING SQUIRREL AS A BIRD KILLER

On April 6, 1914, an adult female flying squirrel (*Glaucomys volans*) was captured with her two young and placed in a roomy cage in the workshop with a section of tree trunk containing a flicker's hole as a nest. Two or three days later a fine male yellow-bellied sapsucker was captured unhurt, and placed in the same cage where he made himself at home on the stump. I was greatly surprised the next morning to find his bones on the bottom of the cage, picked clean. This strong, hardy woodpecker in perfect health had been killed and eaten during the few hours of darkness, by the old mother flying squirrel, though she had other food in abundance. While pondering the tragedy visions of the many holes in the woods that had been found containing feathers and other remains of small birds came to mind, and I wondered if the beautiful and apparently inoffensive flying squirrels were responsible.

Small birds frequently take refuge in old woodpecker holes and natural cavities, where they are at the mercy of such a nocturnal wanderer. I am aware that flying squirrels have been accused of eating birds' eggs and young birds,

and while I have no positive proof that they prey on adult birds in a wild state, I have my suspicions; perhaps others have more conclusive evidence.

My friend, Mr. L. L. Pray, tells me that four flying squirrels in his possession ate prodigious quantities of "pinch bugs," and other beetles, as much as a pint a meal. The wings and legs were cut off, and the bodies eaten. They also displayed a fondness for raw meat, as do the equally mild appearing white footed mice.

—*H. L. Stoddard.*

N. W. Harris Public School Extension of Field Museum, Chicago, Illinois.

THE TECHNICAL NAMES OF TWO COLOBUS MONKEYS

Pennant, in his 'History of Quadrupeds' published in 1781, described two species of four-fingered African monkeys, based on specimens in the Leverian Museum, "brought over by Mr. Smeathman" from "Sierre Leone." The first of these he described and figured (l. c., p. 197, no. 110, pl. xxiv), as the "Full-bottom Monkey," in allusion to the "long, coarse, flowing hairs" of the head and shoulders, "like a full-bottomed periwig." His plate was poorly copied by Schreber, and published as Plate XD, legended as "*Simia Polycomos* Zimmerm." but, as shown below, the plate could not have been issued till after the year 1780,[1] when Zimmermann in his 'Geographische Geschichte des Menschen und der vierfussigen Thiere' (II, 1780, p. 202, no. 105) described his "Der vierfingerige Peruquen-Affe," which he named "*Cebus Polykomos*," based exclusively on the "Full-bottom Monkey" of Pennant,[2] evidently from manuscript notes sent to him by Pennant before the publication of the 'History of Quadrupeds.'[3] The publication of Zimmermann's name and description of the species thus antedates Pennant's by one year.[4] This is the earliest technical designation for this species, usually cited as "*Simia polycomos* Schreber, 1775," the current modern equivalent being "*Colobus polycomus* (Schreber)."

The second of Pennant's two species of monkey here under consideration is his "Bay Monkey" (l. c., p. 198, no. 111), which he says likewise came from Sierra Leone and was based on Mr. Smeatham's specimens in the Leverian

---

[1] Sherborn (Proc. Zool. Soc. London, 1891, p. 590) gives the date of publication as probably about 1800.

[2] Zimmermann, in the third volume of his 'Geographische Geschichte' (1783, p. 170), in his list of African mammals, gave it as "Der vierfingerige afrikanische Affe, *Cercopith. Polykomos*."

[3] Zimmermann thus acknowledges (l c., p. 202) Pennant's favor: "Herr Pennant hat diese neue Affenart, die er in den vortreflichen Kabinette des Herrn Leevers (das reichste an Quadrupeden und Vögeln in Europe) fand, zuerst beschrieben." His citation of Pennant's work is "Full-bottom Monkey. Pennant History of Quadrupeds," without a reference to the page, which he always gives in citing Pennant's earlier 'Synopsis of Quadrupeds.'

[4] Attention was first called in 1902 to the tenability of Zimmermann's name in my paper on "Zimmermann's 'Zoologiæ Geographicæ' and 'Geographische Geschichte' considered in their relation to Mammalian Nomenclature" (Bull. Amer. Mus. Nat. Hist., xvi, 1902, p. 22).

Museum. He did not, however, give a figure of it. This species was technically named by Kerr in 1792 (Anim. Kingd., p. 74, no. 62) *Simia* (*Cercopithecus*) *badius*. Eight years later it was renamed by Shaw (Gen. Zool., i, pt. 1, 1800, p. 59) *Simia ferruginea*, this name being exclusively based on the "Bay Monkey" of Pennant. In 1812 E. Geoffroy (Ann. Mus. d'Hist. nat. Paris, xix, p. 92), emended Shaw's specific designation to *Colobus ferruginosus*, citing Shaw's *Simia ferruginea* as a synonym.[5]

Pennant's "Full-bottom Monkey" and his "Bay Monkey" were thus the base of the first two species of *Colobus* to receive formal technical designations, and were described from specimens from a known geographic source. Furthermore they were the only species originally referred by Illiger to his genus *Colobus* as, respectively, *Simia polycomus* Schreber and *Simia ferruginea* Shaw. The former became (by subsequent designation) the genotype of *Colobus*. The latter (*Simia badius*) is here designated the genotype of Rochebrune's genus *Piliocolobus* (1866), as I fail to find a previous designation of a genotype for this genus.

—*J. A. Allen.*

RECENT LITERATURE

Grinnell, Joseph, and others. CALIFORNIA GROUND SQUIRRELS. A BULLETIN DEALING WITH LIFE HISTORIES, HABITS AND CONTROL OF THE GROUND SQUIRRELS IN CALIFORNIA. Monthly Bull. California State Comm. Horticulture, vol. 7, nos. 11 and 12, November-December, 1918, pp. 595–807, or separate pp. 1–203. January 27, 1919.

This bulletin was put forth to serve as a "manual for the use of county horticultural commissioners and systematic workers," and constitutes "a veritable textbook, through the aid of which it is now possible for the agricultural teacher throughout the public schools to place the subject clearly and concisely before the young patriots who are aiding so largely in the work of extermination."

Its scope will be indicated by the list of articles included: Natural history of the ground squirrels of California, by J. Grinnell and J. Dixon; The Columbian Ground Squirrel, by W. T. Shaw; A history of ground squirrel control in California, by W. C. Jacobsen; A study of fumigation methods for killing ground squirrels, by John S. Burd and G. R. Stewart; The Rodent Control Division, by S. V. Christierson and C. A. Wilkins; and Rodent Eradication work of the Biological Survey in California, by F. E. Garlough. Formulas for destroying rodents are given in the appendix.

The ground squirrels dealt with by Grinnell and Dixon include eighteen forms occurring in California belonging to three genera as follows: *Citellus*, twelve species or subspecies; *Callospermophilus*, three; *Ammospermophilus*, three. Shaw's paper pertains to the chief rodent pest occurring in eastern Washington and portions of neighboring states, the Columbian ground squirrel (*Citellus colum-*

[5] In 1895, in a paper on the names of mammals given by Kerr (Bull. Amer. Mus. Nat. Hist., vii, pp. 179–192), I called attention (l. c., p. 186) to the availability of Kerr's name *badius* over Shaw's *Simia ferruginea*.

bianus). The more strictly economic contributions concern principally *Citellus oregonus* and *Citellus beecheyi* and its subspecies.

Regarding the relation of the study of the life-histories of the Californian ground squirrels to the practical problem of their control the authors (Grinnell and Dixon) state (p. 5): "It would seem that knowledge, as full as possible, of the ground squirrels of California is necessary to determining the most successful means of controlling them and to applying these means properly to the varying conditions throughout our state. This knowledge should include the main distinctions by which each may be known from its relatives, the distribution of each of the species, the extent of the burrows, the breeding rate, the food habits, and, indeed, every other class of facts obtainable relative to their natural history." Going on from this they enunciate a principle of much importance, and one which, all too often, is overlooked by the ultra practical. "It is not often apparent, in advance, which facts will and which will not prove of critical importance in economic work."

After presenting a "Key to the Ground Squirrels of California" based on those external differences which can be most readily appreciated, accounts of the species are presented. The technical matter of less general interest is presented in smaller type with headings as follows: Other names (in addition to the approved vernacular and Latin names recognized by the authors); field characters; description; color variations; measurements; weights; type locality; distribution area; specimens examined. Then follows a full account in larger type of the distribution and habits of the form.

The style is nontechnical and very readable. Perhaps the detailed presentation will discourage a few readers, but any disadvantage here is more than made up by the relative completeness of the information recorded. Possibly the accounts of habits would have been made more accessible and convenient for reference purposes by a series of side heads like those utilized in presenting the technical matter.

The paper is generously illustrated with paintings by Fuertes, photographs, mostly by Dixon, maps, line drawings, and diagrams. It is unfortunate that the paper used is of too poor a quality to do real justice to the half-tones. In spite of this the care put into the illustrations makes the paper unusually attractive. When State and Government authorities realize that severely plain literary style, cheap illustrations and a poor quality of paper are no guarantee of merit or even of true economy, and that real attractiveness is an important element of each paper, it is likely that there will be a more active demand for State and Government publications on the part of the public than is the case at present.

A number of drawings to scale of the burrow systems of the different squirrels are of interest.

No novelties in systematic status appear. The geographic range of *Citellus beecheyi beecheyi*, formerly believed to embrace the Upper Sonoran, Lower Sonoran and Transition zones of west-central California throughout the coast region as far south as Ventura County, is now extended southward to include the coastal portions of the State to the Mexican line, the range of *C. b. fisheri* being correspondingly restricted.

That systematic work may possess at times considerable importance from the standpoint of economic problems is indicated by certain facts concerning the

Douglas ground squirrel. Apparently differences in color separating this squirrel from others in California are associated with differences in habitat and food preference as well (p. 53). It is unfortunate that there are those who question the value of systematic work, description, and classification. As the eminent English mammalogist Hinton says, ". . . so many have yet to learn that all branches of science are valuable and interdependent, that in reality there are not two kinds of science—one called 'applied,' essential, it extracts gold; the other called 'pure,' quite unimportant it extracts nothing but facts." (M. A. C. Hinton, Rats and mice as enemies of mankind, British Museum of Natural History, London, 1918, pp. 26–27.)

Further on in the account of the Douglas squirrel the principle is enunciated that "the squirrels require a certain amount of space around them so that they can have a fair show of reaching the safety of their burrows after an enemy is first caught sight of" (p. 54). This principle is apparently of general application among the Sciuridæ.

While in the past, hibernation of animals as a result of the effect of cold and snow has been emphasized, estivation due to a lack of moisture has hardly received its share of attention. Recent investigations have demonstrated its importance. Thus Grinnell and Dixon show that the Oregon ground squirrel of the warm Upper Sonoran and Transition zones of northern California disappears from view during July and does not reappear until the following March (pp. 66–67). On the other hand the Belding ground squirrel (*Citellus beldingi*) of the cold Hudsonian Zone of the high Sierra Nevada does not become quiescent until a full two months later than the Oregon ground squirrel (p. 72).

The immensity of losses to agriculture caused by squirrel pests is seldom fully appreciated. The authors' studies of *Citellus oregonus* lead them to conclude that 30 grams of forage are eaten daily by each individual. In thickly settled squirrel country the average number of the animals per square mile is estimated at 70,000. This number will consume 2,100,000 grams, or more than 2 tons of green forage per square mile every day. "Granted that a grazing steer eats 50 pounds of pasture forage each day, we conclude that the squirrels on a square mile of pasture appropriate each day the forage which might support ninety head of cattle" (p. 63).

W. T. Shaw's paper on the Columbian ground squirrel (pp. 118–128) is worthy of more than casual attention. This contribution, based on years of work by the author, is all too short, and impels the reader to look with keen anticipation to the publication of the full report of Professor Shaw's illuminating investigations. These ground squirrel papers of Grinnell and Dixon and of Shaw are of a type of zoölogical investigation which has been all too rare in mammalogy, particularly in this country.

Much credit is due to the State leaders of rodent control in California for the enlightened manner in which they are dealing with their problems. If those in charge of practical projects of rodent control and animal administration generally made as vigorous efforts to stimulate scientific research of a basic character and then to utilize the results thereof, there is no doubt whatever that greater progress would be achieved than is now the case.

—*Walter P. Taylor.*

Jordan, David Starr, and James Zaccheus Gilbert. Fossil Fishes of Southern California. II. Fossil Fishes of the Miocene (Monterey) Formations. Leland Stanford Junior Univ. Public., Univ. Series, pp. 13–60, 1919. Delphinidæ, p. 60.

At the end of the second paper of this group, pp. 59 and 60, is an account, rather more than a page, descriptive of three slabs of stone which either contain impressions (matrices) of cetacean vertebræ, or the fossils themselves. They are all somewhat dubiously referred to *Delphinus occiduus* of Leidy which is in the same manner transferred to *Phocæna*. It seems unfortunate that such slight and uncertain evidence should result in a generic change for Leidy's type, which is undoubtedly not congeneric with either of the names that have been used. The specimens are from San Pedro and Lompoc, Los Angeles and Santa Barbara Counties, in diatomaceous shales and of uncertain Miocene age. The essential synonymy of *Delphinus occiduus* Leidy, the type of which is in the Museum of Comparative Zoölogy, Harvard University, is as follows:

Delphinus occiduus Leidy, Proc. Acad. Nat. Sci. Phila. 1868, 197 (type locality Half-moon Bay, Calif.); Jour. Acad. Nat. Sci. Phila. 1869, 431; Cope, Am. Nat., 1890, 616; Trouessart, Cat. Mam., 1898, 1031; Hay, Bull. U. S. Geol. Survey, 179, Fossil Vert. N. Am., 1901, 594; Eastman, Bull. Mus. Comp. Zool., 1907, 93–94, plate 4, fig. 1 (type).

Phocaena occiduus, Jordan and Gilbert, Leland Stanford Junior Univ. Public., Univ. Series, Fossil Fishes of Southern California, 1919, II, pp. 59, 60, plate IX, fig. 2; plate XXVIII, figs. 1, 3.

—*William Palmer.*

Allen, A. A. A Christmas walk with birds and beasts. Amer. Forestry, vol. 25, pp. 1526–1530, 12 figs., December, 1919. (Popular account of tracks of common eastern mammals.)

Allen, J. A. Severtzow's classification of the Felidæ. Bull. Amer. Mus. Nat. Hist., vol. 41, pp. 335–340. September 22, 1919. (Discussion of status and type-species of the 27 subgeneric names applied to cats by Severtzow, 1857–1858; and comparison with Pocock's "Classification of Existing Felidæ," 1917.)

Allen, J. A. Notes on the synonymy and nomenclature of the smaller spotted cats of tropical America. Bull. Amer. Mus. Nat. Hist., vol. 41, pp. 341–419; figs. 1–31. October 3, 1919. (The following genera are recognized for Neotropical cats, excepting jaguars and pumas: *Leopardus* Gray, type *pardalis; Margay* Gray, type *wiedii; Oncilla*, new, type *oncilla; Noctifelis* Severtzow, type *guigna; Oncifelis* Severtzow, type *geoffroyi; Lynchailurus* Severtzow, type *pajeros; Herpailurus* Severztow, type *yaguarondi*. These include 37 forms.)

Anderson, Rudolph Martin. Addition to list of mammals of Jasper Park, Alberta. Canadian Alpine Journ., vol. 10, p. 69. 1919. (*Mustela rixosa* taken on Miette River, July 11, 1898.)

Beebe, William. Higher vertebrates of British Guiana. With special reference to the fauna of Bartica District. Zoologica, vol. 2, no. 7, pp. 205–227, May, 1919. (Contains a preliminary checklist of mammals, including 119 forms.)

CABRERA, ANGEL. Genera mammalium. Monotremata, Marsupialia. Museo Nacional de Ciencias Naturales, Madrid. Pp. 1–180; 19 plates. June 23, 1919. (Keys to the families and genera, and lists of the species and subspecies of monotremes and marsupials, with geographical distribution. New generic names are *Minuania*, type *Didelphis dimidiana* Wagner; *Holothylax*, type *Didelphis opossum* Linné; and *Amperta*, type *Chætocercus cristicauda* Krefft.)

CADWALADER, WILLIAMS B. Report of the board of directors. Forty-seventh Ann. Rep. Zool. Soc. Philadelphia, pp. 1–18. 1919. (Mammals exhibited in the Philadelphia gardens for the first time include the Sumatra tiger, Texas fox squirrel, Sumatra elephant, and Kashmir deer.)

CLARKE, JOHN M. An elephant with four tusks. Science, n. s., vol. 50, pp. 395–396, 1 fig. October 24, 1919.

DE ONG, E. RALPH. Parasites which affect the food value of rabbits. California Fish and Game, vol. 5, no. 3, pp. 142, 143. July, 1919. (Relates particularly to wild rabbits of California.)

DIXON, JOSEPH. Notes on the natural history of the bushy-tailed wood rats of California. Univ. California Pub. Zool., vol. 21, pp. 49–74, plates 1–3. December 10, 1919. (General account of *Neotoma cinera cinera* and *N. c. occidentalis*. The supposedly extinct species, *Teonoma spelaea* Sinclair, is considered inseparable from *N. c. occidentalis*.)

EVERMANN, BARTON WARREN. The northern fur-seal problem as a type of many problems in marine zoology. Sci. Monthly, vol. 9 (Sept.), pp. 263–282, 10 figs. August 30, 1919. (Brief history of the Pribilof seal herds, from the discovery of the islands in 1786 down to the present time.)

FERRIS, G. F. Anoplura of the Canadian arctic expedition, 1913–1918. Rep. Canadian Arctic Exped. 1913–1918, vol. 3, part D, p. 11d. September 12, 1919. (Report on lice collected by Frits Johansen and A. Castel on arctic mammals.)

GRINNELL, JOSEPH. Four new kangaroo rats from west-central California. Proc. Biol. Soc. Washington, vol. 32, pp. 203–205. December 31, 1919. (The genera *Perodipus* and *Dipodomys* are combined, and new forms are described as follows: *Dipodomys jolonensis* and *D. sanctiluciae* from Jolon, Monterey County; *D. berkeleyensis* from Berkeley; and *D. californicus eximius* from Sutter County.)

GRINNELL, JOSEPH. See also Hall, Harvey Monroe, and Joseph Grinnell.

GYLDENSTOLPE, NILS. A list of the mammals at present known to inhabit Siam. Journ. Nat. Hist. Soc. Siam, vol. 3, pp. 127–175. August 1, 1919. (304 forms are listed, with original references and notes on occurrence. The publication of such papers should be greatly encouraged.)

HALL, HARVEY MONROE, AND JOSEPH GRINNELL. Life-zone indicators in California. Proc. California Acad. Sci., 4 ser., vol. 9, pp. 37–67. June 16, 1919. (Lists the plants and vertebrate animals used in determining the various life-zones of the state.)

HAMLYN, JOHN D. The Okapi. Hamlyn's Menagerie Mag., vol. 5, no. 4, pp. 25–27. August, 1919. (Account of the living specimen received at the Antwerp zoological gardens, August 9, 1919. This animal died on September 29, according to a later note in the October Hamlyn's Magazine.)

HAMLYN, JOHN D. Fate of the Addo elephants. Hamlyn's Menagerie Mag., vol. 5, no. 4, pp. 28–30. August, 1919. (Tells of plans being made for the extermination of the last remaining herd of South African elephants, 150 to 200 in number. The October number of Hamlyn's Magazine gives further details of methods used in the killing of these animals.)

HAMLYN, JOHN D. The Addo Bush elephants. Hamlyn's Menagerie Mag., vol. 5, no. 7, pp. 51–55, figs. 1–4. November, 1919. (Protests against the extermination of this last herd of South African elephants.)

HARMER, S. F. Subantarctic whales and whaling. Abstract, Weekly Evening Meeting (May 16, 1919), Roy. Inst. Great Britain, pp. 1–5. 1919.

HINTON, MARTIN A. C. Notes on the genus *Cricetomys*, with descriptions of four new forms. Ann. and Mag. Nat. Hist., ser. 9, vol. 4, pp. 282–289. October, 1919. (*C. gambianus* of authors said to include at least four good species; new forms described from Sudan, Belgian Congo, Zanzibar, and Nigeria.)

HOLLISTER, N. Report on the National Zoological Park. Appendix, Rep. Secy. Smithsonian Inst., 1919, pp. 68–81. December, 1919. (On June 30, 1919, the collection contained 528 mammals, of 156 species. Among the more unusual species for zoological park collections are the Apache grizzly, glacier bear, brown hyena, African cheetah, Rocky Mountain and Arizona mountain sheep, African and Sumatran elephants.)

HORNADAY, W. T. Rational use of game animals. Reprinted from Wild Life; its Conservation and Protection, of the Commission of Conservation, Canada, pp. 1–11. 1919. (On the necessity for protection of game in the north, with special reference to the great game of Alaska; with suggestions for legislation.)

HOWELL, A. BRAZIER. A new cotton rat from Arizona. Proc. Biol. Soc. Washington, vol. 32, pp. 161–162. September 30, 1919. (Describes *Sigmodon hispidus cienegæ* from Pima County.)

KLOSS, C. BODEN. See Robinson, Herbert C., and C. Boden Kloss.

KOLLMANN, MAX. Sur la présence de l'os planum chez les Lémurines. Bull. Mus d'Hist. nat., 1919, no. 5, pp. 1–3. 1919.

LOMEN, CARL J. The camel of the frozen desert. Nat. Geog. Mag., vol. 36, pp. 539–556, with 19 illustrations. December, 1919. (An account of the introduced reindeer in Alaska. The selection of such a misleading and inappropriate title for this article is unfortunate.)

LÖNNBERG, EINAR. Remarks on some South American Canidæ. Arkiv för Zoologi, vol. 12, no. 13, pp. 1–18; figs. 1–4. 1919. (On the affinities of *Pseudalopex lycoides* Philippi and the dog of the Yaghan Indians, Tierra del Fuego.)

LORD, CLIVE E. See Scott, H. H., and Clive E. Lord.

MILLER, GERRIT S., JR. Bibliography, 1888–1918. Report VII of the Class of Harvard 1894, pp. 588–599. 1919. (Complete list of published papers, the majority of which relate to mammals.)

MILLS, ENOS A. The grizzly, our greatest wild animal. 289 pp., 10 plates. Houghton, Mifflin and Co., Boston and N. Y., the Riverside Press, Cambridge. September, 1919.

NELSON, E. W. Report of chief of Bureau of Biological Survey. Pp. 1–24. November, 1919. (For year ending June 30, 1919. The federal big game reservations in charge of the bureau contained on this date 368 bison, 274 elk, 54 antelopes, and 21 deer.)

OSBORN, HENRY FAIRFIELD. The Congo expedition of the American Museum of Natural History. Introduction. Bull. Amer. Mus. Nat. Hist., vol. 39, pp. xv–xxvii. August 1, 1919. (An account of the expedition, its routes, and a summary of the collections made, together with a most excellent map showing the localities visited.)

POCOCK, R. I. The classification of the mongooses (Mungotidæ). Ann. and Mag. Nat. Hist., ser. 9, vol. 3, pp. 515–524. June, 1919. (The family Mungotidæ is formally recognized and a key to its subfamilies and genera is given.)

ROBINSON, HERBERT C., AND C. BODEN KLOSS. On five new mammals from Java. Ann. and Mag. Nat. Hist., ser. 9, vol. 4, pp. 374–378. December, 1919. (New forms of *Pithecus* [*Pygathrix* of recent authors], *Rattus*, and *Mycteromys*.)

ROYAL ZOOLOGICAL AND ACCLIMATISATION SOCIETY OF VICTORIA. Fifty-fifth annual report and report of the annual meeting of the society, for the year 1918. Melbourne, 1919. (List of animals living in the gardens. An orang-utan has now been in the Melbourne collection for fifteen years, and is probably eighteen years old.)

SCOTT, H. H., AND CLIVE E. LORD. Studies of Tasmanian Cetacea. Part II. Royal Soc. Tasmania, Pap. and Proc., 1919, pp. 23–32, 1 plate. July 24, 1919.

SHUFELDT, R. W. The racoons of North America. Amer. Forestry, vol. 25, pp. 1531–1536, 5 figs. December, 1919. (Popular account of raccoons and their allies.)

SPREADBOROUGH, WILLIAM. Notes on some of the more common animals and birds of the Canadian Rockies. Canadian Alpine Journ., vol. 10, pp. 51–68. 1919. (Interesting field notes on bears, marmots, ground-squirrels, pikas, wood rats, chipmunks, and squirrels.)

SWARTH, HARRY S. Some Sierran chipmunks. With notes on photography of small mammals by Joseph Dixon. Sierra Club Bull., vol. 10, pp. 401–413, 3 plates. 1919.

TAYLOR, WALTER P. Suggestions for field studies of mammalian life-histories. U. S. Dept. Agric., Dept. Circ., 59, pp. 1–8. September, 1919. (Mailed to all members of the American Society of Mammalogists.)

TAYLOR, WALTER P. A new pocket gopher from western Washington. Proc. Biol. Soc. Washington, vol. 32, pp. 169–171. September 30, 1919. (Describes *Thomomys douglasii tacomensis* from Pierce County.)

THOMAS, OLDFIELD. Two new gerbils from Sinai. Ann. and Mag. Nat. Hist., ser. 9, vol. 3, pp. 559–560. June, 1919. (Describes *Gerbillus floweri* and *G. bonhotei*.)

THOMAS, OLDFIELD. The method of taking the incisive index in rodents. Ann. and Mag. Nat. Hist., ser. 9, vol. 4, pp. 289–290, with one figure. October, 1919.

THOMAS, OLDFIELD. The types of the mammals described by M. Fernand Lataste. Ann. and Mag. Nat. Hist., ser. 9, vol. 4, pp. 350–354. November, 1919. (Lataste collection now in British Museum, and types and lectotypes are here listed.)

WEIDMAN, FRED D. Report of the laboratory of comparative pathology. Forty-seventh Ann. Rep. Zool. Soc. Philadelphia, pp. 18–25. 1919. (Data on autopsies held at the Philadelphia zoological gardens.)

WHITING, P. W. Inheritance of white-spotting and other color characters in cats. Amer. Nat., vol. 53, pp. 473–482. November, 1919.

CORRESPONDENCE

ENGLISH NAMES OF MAMMALS

To the Editor, Journal of Mammalogy:

Not long ago it was my privilege to appear in "The Auk" as an advocate of English, that is, truly popular names for birds. The matter is largely a literary one, but all are agreed that popular knowledge of the bird is greatly helped by an exact, right, and acceptable name.

Precisely the same thought applies to Mammals, and I hope you will allow me to discuss it here.

For the diffusion of knowledge in an English-speaking country, one must have English names; a name to be popular in our language must be short and descriptive. It must be different from other names. If a foreign word, it must be composed of the sounds represented in our alphabet. It should tie the creature up with familiar ideas. It must be easily said, and it must be pat. It should be a monosyllable, or if of more than one syllable, it should have the accent on the first; otherwise it will hardly be English, and will stand much less chance of success.

Those of us who have known the west for a generation, have witnessed the triumphant march of the monosyllable.

The victory of 'peak' over 'mountain,' 'gun' over 'revolver,' 'rope' over 'lariat,' are cases in point. Or to keep to animal illustrations, note the displacement of 'Lobo' by 'Wolf,' of 'broncho' and 'cayuse' by 'horse,' of 'Kit-fox by 'Swift,' of 'Polecat' by 'Skunk.'

The usual shortening of the word and the forward trend of the accent are shown in the successive names of *Canis latrans*. The early travellers bade us call it 'Small Prairie Wolf.' Then the word 'Coyote' (coy-o'-te) came from the South, with its three full syllables, the accent on the second. But the inevitable process set in, when it got beyond Mexican influence. It was shortened to 'Coyote' (coy'-ote), and sometimes flattened to 'Kyute' (ky'-ute).

Again 'sewellel' or 'showtl' are accepted book names of the 'Aplodontia.' They are fairly well established, good in construction; and probably unlike the original Indian words, for they have been Englished; but still they have no foothold in the memory, and are being very hard pressed by the undesirable names, 'Mountain Beaver' and 'Blue Muskrat,' which, being constructed of familiar elements, may put out the other names altogether.

'Prairie Marmot' is an example of bookish absurdity. Of course, it would not stand up against the pat 'Prairie-dog,' which in spite of one hundred years of books, is now firmly established in the books themselves.

Similarly no doubt, the victory of the strong, angular word 'Rabbit' over the shorter and rather featureless word 'Hare' is due to its patness, and the ease with which it may be said and remembered.

Among the animal names which have succumbed to these inevitable forces, I might further illustrate 'Wood-hare,' as the bookmen insisted on calling it for two hundred years, now admitted to be 'Cottontail;' 'Jackass hare' or 'Prairie hare' now 'Jack-rabbit;' 'Bay-lynx' now 'Bobcat;' 'Mephitic Weasel' now 'Skunk;' 'Striped Groundsquirrel,' now 'Chipmunk,' while 'Pika' and 'Little Chief Hare' have surrendered to 'Coney.'

The 'Varying Hare' of the bookmen is now fully established as the 'Snowshoe Rabbit.' The 'Maryland Marmot' is the 'Woodchuck,' and the 'Argali' of the early writers is now wholly and exclusively the 'Big-horn' or 'Mountain Sheep.' Sad to relate, however, I see many evidences that the monosyllabic trend is threatening to establish 'Sheep' on the grave of 'Bighorn.'

Part of last winter I spent on the Mohave Desert at a ranch, associated with some boys who were keen on natural history. *Onychomys* was plentiful and easily trapped. I gave the boys their choice of its various names, *Onychomys*, Mole-mouse, Bobtailed Deermouse, Grasshopper Mouse, and Calling-Mouse. I gave the reasons for each name, and asked them which they preferred. The first two did not receive very long consideration. 'Grasshopper Mouse' in spite of explanations, they thought too suggestive of 'Kangaroo-rat;' the hopping dominated their thought. All agreed finally, that 'Calling-Mouse' was the best name. A week later I found that this was the only one that they remembered, which seems to me a very important evidence of its value as a name.

I had a similar experience with 'Antelope Chipmunk' vs. 'Cottontail Chipmunk.' The latter was easy to say, pat, descriptive, and worked with familiar ideas. Antelope are unknown now, therefore 'Cottontail Chipmunk' won. So, also, 'Little 4-striped Chipmunk' had no chance with 'Snow-chipmunk.'

Every naturalist will recall examples of the same sort, and the struggle between the imitation English and the really evolved English name. The ultimate survival of the latter is inevitable.

There is one other case that should be considered, and that is 'Mammal' vs. 'Quadruped' or 'Animal.' The popular and English names for the creatures under consideration, are 'brutes,' 'beasts,' 'quadrupeds' or 'animals.' 'Mammal' is bastard Latin, not English, and seems never likely to be. 'Quadruped' was accepted by Audubon, Bachman, Kennicott, and many others, and has become English, for custom has excluded the frogs, lizards, and turtles from the quadruped list just as completely as it has the tables and chairs. But 'animal' is even more widely established now, and, in the restricted sense of 'mammal' is accepted by the Century Dictionary. We may as well do the same thing.

Of course the bookmen in defense of their position hark back to the original meaning, the derivation of the word. To this, I reply, such an argument, if allowed full weight, would abolish the English language altogether.

Original meaning has no weight whatever against national usage. These broad conclusions, then, will, I think prove acceptable:

That as soon as familiar with an animal, the popular mind evolves a name for it, and that name is nearly always better than the artificial product of some scientist.

That an enormous impetus is given to the study, as soon as we get good names.

Let us therefore accept the book names proposed until better are found, but let us encourage everyone interested to gather up, record, develop, suggest, or invent a good name, whenever the opportunity or the inspiration arrives.

Then we shall have the irresistible power of the genius of English backing the study, instead of bucking it, as at present.

Yours very sincerely,
Ernest Thompson Seton.

Greenwich, Connecticut,
November 25, 1919.

THE "GENERAL NOTES" COLUMN

To the Editor of the Journal:

Many members of the American Society of Mammalogists have signified their interest in the work of the Committee on Life-Histories, while those professing an interest in the work of the other committees are so far few in number. The reasons for this are perfectly obvious. The study of specimens, bones, and books is interesting; but the study of the living animal is even more interesting. It is perhaps not strange that because it is possible for persons without special training to acquire an interest in socalled popular natural history and because superficial and inaccurate observations have sometimes become current there has arisen in some quarters a prejudice against popular science.

Robert Ridgway once wrote "There are two essentially different kinds of ornithology: *systematic* or *scientific*, and *popular*. The former deals with the structure and classification of birds, their synonymies and technical descriptions. The latter treats of their habits, songs, nesting, and other facts pertaining to their life-histories" (The Birds of North and Middle America, Bull. 50, U. S. Nat. Mus., Part 1, 1901, p. 1). To the mind of the writer this distinction is a mistaken one. Is not the study of habits exactly as scientific as the study of structure? Structure acquires significance only as some habit is associated with it. It is, moreover, still an open question whether structure arose before habit, or habit before structure. Is not the distinction rather between the true and accurate and the false and inaccurate, whether one studies structure or habits, than between the *scientific* and *popular*? There is nothing inherently scientific about studies of specimens, bones, and books; nor anything inherently unscientific in studies of habits and life-histories. The scientific method can be applied as readily to the one as to the other.

I was impressed with your statement in the last number of this Journal that "Papers of general interest on life-histories, distribution, and habits are particularly needed, in order that the Journal may not be overbalanced with purely technical matter." With this proposition it is believed all readers of the Journal will be in agreement.

A tendency far too common among observers of wild life is to minimize the importance of their studies of habits. The dearth of information concerning the life-histories of some of our commonest mammals is amazing. It is consequently urged that papers and general notes in this province be submitted for publication. In particular the column of General Notes should become one of the most popular and best supported departments of the Journal.

It should be remembered that any sincere student with an enthusiasm for closer acquaintance with wild life can well become active in this field. "No human being and no book, but nature herself, is the supreme authority in natural history. The beginner may make as important an observation as the veteran investigator. The efforts of all are needed if our fund of information is in any sense to be complete" (Dept. Circular 50, U. S. Dept. of Agriculture, p. 4).

Walter P. Taylor.

LOCALITY, DATE, AND NAME WITH OBSERVATIONS

To the Editor, Journal of Mammalogy:

Your Journal is certainly a godsend in affording us restless ones a place to post our views and to learn those of others. You have been generous to me in giving me so much space for my observations, will you allow me a few lines to state some grievances, or at least to point out some wrong methods that have caused a great deal of unnecessary annoyance and loss.

1st. Observations given without place or date. I have before me a note on three Mink by a leading naturalist, but no date. If it was spring, it was highly significant—if it was autumn, it meant nothing.

2nd. Dating with numbers for months. Some [illegible] the logical sequence—day, month, year. Some, alas! including our Post Office officials use it "month, day, year." I have before me a specimen from a leading museum with the field label on it marked 8/4/98 and the museum label 4/8/98. Which is it? Can't we use Roman numerals for the month, or the established abbreviations, and end such muddles?

3rd. I have before me an adventure with a Lynx, by "Mr." Mackenzie of Labrador. If it was Peter Mackenzie, it is valuable. If any of the 75 other Mackenzies it is interesting, but doubtful. If by Nicodemus or Ananias Mackenzie, it is waste paper. I would never use "Mr." in such connection. It generally means that the recorder did not think it worth following up. Of course, "Dr." or "Miss" or "Mrs." are all right for they have identification force, but not "Mr."

If Sir John Richardson had talked of "Thomas Hutchins" instead of "Mr. Hutchins," it would have saved a world of trouble and prevented the injustice that robbed Hutchins of the credit of his great work.

4th. Citation, without mention of source. I have before me some observations on the jump of a Mexican Squirrel, quoted, without mention of source, by a modern writer. If the source was one well known Mexican traveller it is of the highest value, if by another that I have in mind, it should be scrapped.

Yours sincerely,

Ernest Thompson Seton.

Greenwich, Conn.,
20 December, 1919.

EDITORIAL COMMENT

The committee on life-histories of mammals promises to be one of the most active of the standing committees of the American Society of Mammalogists. President Merriam appointed as the chairman of this committee, Dr. Charles C. Adams, director of the Roosevelt Wild Life Forest Experiment Station, New York College of Forestry, Syracuse, New York; and asked the chairman to name the other members of his committee. Doctor Adams now announces his selections as follows: Dr. Rudolph M. Anderson, zoologist, Biological Division, Geological Survey of Canada; Mr. Vernon Bailey, chief field naturalist, Biological Survey United States Department of Agriculture; Dr. Harold C. Bryant, Bureau of Education, Publicity, and Research, California Board of Fish and Game Commissioners; Dr. Lee R. Dice, curator of mammals, Museum of Zoology, University of Michigan; Dr. Hartley H. T. Jackson, assistant biologist, Biological Survey, United States Department of Agriculture; Dr. T. S. Palmer, assistant biologist, Biological Survey, United States Department of Agriculture; Mr. Ernest Thompson Seton, Greenwich, Connecticut; Dr. Walter P. Taylor, assistant biologist, Biological Survey, United States Department of Agriculture; and Mr. Herbert Lang, assistant curator mammalogy, American Museum of Natural History. Mr. Lang is chairman of a subcommittee on exotic mammals. Good results may be expected from such a committee, and, in any work planned, the chairman may confidently look for the hearty coöperation of all the members of the Society.

The second annual meeting of the American Society of Mammalogists will be held in New York City, beginning Monday, May 3, 1920.

Since the first number of the Journal has been issued, many letters regarding it have been received. All speak enthusiastically of the initial number, and, as requested by the editor, many make suggestions for future improvement. Each criticism or suggestion has been listed and before the close of the year all will have the careful consideration of the committee on publications. It has been deemed best to make no conspicuous changes in the make-up, typography, or style of the Journal except at the beginning of a new volume, so there will be plenty of time to weigh carefully all arguments for proposed improvements. The most general of all these friendly, helpful criticisms is regarding the lack of articles on "life-history." If this is a serious fault, it is one for which the management is in no way to blame; and if we are to have a more nearly balanced magazine those members who are particularly interested in the habits of mammals must furnish the articles and notes for publication. It may be said, however, that several important contributions of this kind are already promised and it is expected that before long the pages of the Journal will contain a fair proportion of interesting papers on the life-histories of mammals.

The actual date of publication of the first number of the Journal of Mammalogy was November 28, 1919.

Mr. Seton's letter on the English names of mammals in this number of the Journal brings this troublesome question up for discussion. It is a matter that will bother the editors of the Journal for all time, for, unlike the case with birds,

the great majority of our small mammals have no common names, and authors are forever inventing them. Unhappily these newly invented names are often absurd, as Mr. Seton rightly says, and they very rarely fill any good purpose.

The truth is that at present comparatively few of our small mammals need specific or subspecific vernacular names; a single common name for all the members of a genus is frequently quite sufficient, and for writers of technical mammalogy to invent such names merely that their books or lists may be, in a sense, complete or consistent, is folly. The best plan unquestionably would be for authors of works on mammals to use only such common names as are actually in service; ignore ridiculous book names invented without sufficient cause; and, for a host of our species, wait until real names do appear in the language. If the comparatively few names introduced into the literature of North American mammals by Audubon and Bachman, and other early writers, have so signally failed, what then is the prospect for some of the later inventions now that our list of mammals has increased many-fold since those classic works were prepared.

The most ambitious recent attempt at giving all of our mammals common names was that of the late D. G. Elliot, who systematically coined English names for most of the American forms. Beginning with his Land and Sea Mammals of Middle America and the West Indies in 1904, and continuing through several later works on the mammals of America and other parts of the world, Elliot thought it necessary to provide every single species and subspecies with a vernacular name. Without, apparently, any serious attempt to find out what names might already have been given to a few of these creatures, in print or otherwise, he proceeded to coin as unreasonable a collection of names as could well be imagined. One of the principal sources for these names was the technical names of the mammals, which he merely translated into English. The results are wonderful to behold. How many persons, including the most learned of professional mammalogists, know today what mammal is named the fighting bear, the thievish coyote, dark coati, allied weasel, irrational shrew, prominent-eared bat, doubtful kangaroo rat, graceful bat, captious harvest mouse, Hamilton Smith's white-tailed deer, beautifully garbed chipmunk, cunning red-backed vole, trader spermophile, robust field mouse, beautiful mole mouse, least upland meadow vole, roaming pocket gopher, alien mouse, sand-frequenting pocket gopher, smallest spiny mouse, autocrat timber wolf, robber raccoon-fox, happy chipmunk, narrow-headed spotted skunk, or the curtailed fox? These atrocities are not carefully selected to show the horror of it all—they are listed at random in a few moments' time. There are hundreds equally bad, including the cantankerous meadow vole, the cheating woodrat, the tricky coyote, and the degenerate otter. They were always carefully double-indexed in a special section called "Index of Common Names!"

Very few of these names have ever been copied by other writers and certainly none of them have worked their way into the language of the layman or of the amateur naturalist, for whose benefit it is assumed they were coined. Occasionally we see some of them in print, probably because some author thinks it advisable to use names already formally bestowed upon certain animals rather than to make new ones. But of what use are they? Why *should* we use them? They are not common names in any sense, and they never will be known even to men devoting their lives to the study of mammalogy. In listing mammals,

there surely is no harm in leaving some obscure species and many geographical races without special English names. If they have no English names, and many species are almost unknown to the residents of the region where they abound, it is far better to wait for the name to come naturally, as it will if required. How much better it is to have an open field for a good, real name, a "pat name," as Mr. Seton calls it, than to have our literature burdened with these utterly useless, hopeless, and impossible names made up on the spur of the moment by writers, merely to fill out their books, or perhaps reluctantly admitted because some editor, who knows nothing of the case, insists that every animal have an English name.

Common or English names are necessary for well-known species or groups of species. A few more might at present be useful for species-groups of such mammals as white-footed mice, meadow mice, wood rats, and others. Groups of forms known to hunters, trappers, naturalists in general, farmers and others, indeed most mammals that are commonly observed, or actually *need* them, already have good local names; if we but inquire among those familiar with the animals we may learn them and from them select good ones for use in print. Like the local names of birds, such names are sometimes used for different species in different localities. The pocket gopher is called salamander in Florida, where a tortoise is the gopher; and the spermophile is called gopher in parts of the West. This and other cases are as confusing as partridge and pheasant among bird names. In such cases it is perhaps best to persist in the use of a good book-name like pocket-gopher, spermophile, or ground-squirrel. If the name is a good one it may eventually win, just as ruffed grouse has become quite generally understood almost anywhere within the range of that species.

The common names in use for most distinct species of well-known mammals may be modified by geographical or other pertinent adjectives if it is necessary to have special English names for closely related forms or subspecies. But just because a form is recognized by the specialist, and is given a technical name, does not make it necessary that it have, at once, an English or common name differing from that of some closely related form, a form perhaps impossible for anyone except the specialist to distinguish. Only the specialist needs names for these slight subspecies, and he has provided the technical names for his own use.

Real, honest, actually-used local names should be collected, published, and made available. But let us stop coining absurd "book-names" for every small mammal we need to mention. And above all, let us cease to try to perpetuate or force into the language such names as listed above. They serve no purpose whatever, most of them stand no chance of survival, and it is perhaps actually harmful to use them in print.

—N. H.